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STEEL

The Magazine of Metalworking and Metalproducing

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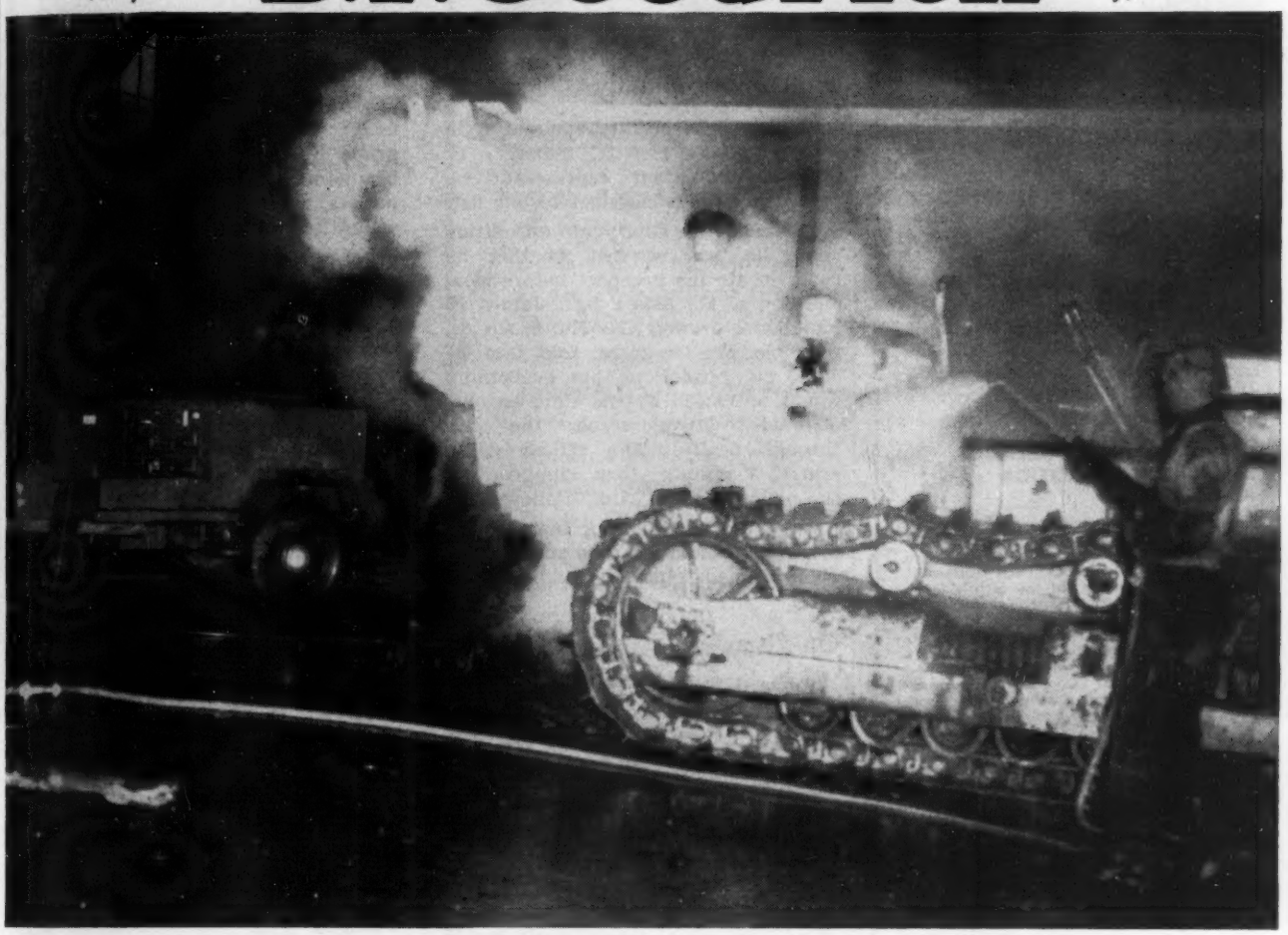

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STAINLESS STEEL

STRAIGHT CHROME GRADES

Stainless Steel comes closer to being a perfect metal than any other now in general use. There are two basic classifications of this "magic metal": the straight chromium types, and the chromium-nickel types. This column is concerned at this time with the first type—the straight chromium grades.

It is generally agreed that the resistance to corrosion of stainless steel is mainly due to a thin, stable, transparent film of iron chromium-oxide which forms in the presence of oxygen. This protecting film is a characteristic of chromium. Although some steels classed as stainless have as little as 4 per cent chromium content, the film does not become efficient until the chrome content exceeds 11 per cent.

CARBON-CHROME BALANCE REGULATES CORROSION RESISTANCE

Straight chromium stainless steels are divided into two general classes—(a) the martensitic (hardenable alloys which are pearlitic when annealed and martensitic when quenched), and (b) the ferritic (non-hardenable magnetic alloys.) For discussion purposes we can say the difference between the two groups is the chromium-carbon balance. Martensitic types are generally low chromium—high carbon grades; ferritic types being high chromium—low carbon grades. The carbon content effects both the corrosion resistance and the hardenability of the steels.

Martensitic steels are hardenable, but ferritic grades are non-hardening. Increasing the carbon or decreasing the chromium increases the susceptibility to hardening. Both straight chromium steels are magnetic. Although the straight chromium types do not possess the ductility found in the chromium-nickel grades they are tougher, hold an edge longer, have satisfactory corrosion resistance and are considerably less expensive due to the absence of nickel. The more popular grades are:

TYPE 410 is a straight chromium grade known metallurgically as martensitic. Depending on the requirements the chromium content may be varied from 11 to 14 per cent. Type 410 has exceptionally good physical properties, but due to the absence of nickel and the relatively low chromium content it is not recommended where severe corrosion will be encountered. The milder acids, fresh water and normal atmosphere, however, will have no effect on this type. It is deep-hardening and magnetic. When hardened and stress relieved it is corrosion-resistant and abrasion-resistant. Tempered to intermediate hardness it combines good strength with good toughness. Fully annealed it can be formed and drawn. Not recommended for welding applications. Recommended for cutlery, coal chutes, furnace parts, shovel stock, and high tensile strength uses.

TYPE 430 (Ferritic) Most popular of the straight chromium grades. It possesses good mechanical and physical properties and a ductility about three-fourths that of carbon steel deep drawing quality. Type 430 is non-hardening by heat treatment and only mildly hardening by cold working. It has an excellent resistance to destructive heat scaling, low coefficient of expansion, and strength at elevated temperatures. Applications where there is a need for general corrosion resistance and scaling resistance up to 1600° F. Long exposures between 700° and 1100° F., however, tend to decrease ductility and toughness when the metal is cooled to room temperatures. Used for architectural trim, automotive trim and builders hardware.

TYPE 440-B (Martensitic) A high carbon, 17 per cent chromium steel that has excellent edge-retaining qualities. Used for cutlery, surgical tools, valve parts and sealing rings.

(This is one of a series of reports on stainless steels that will appear monthly in this column through the courtesy of the **Sharon Steel Corporation.** NEXT: Chromium-Nickel Grades.)

Advertisement

Behind the Scenes . . .

Southern Hospitality

Southern hospitality—police style—helped Gary Hewitt, manager of STEEL's circulation representatives, to add another subscriber to our list.

In Greenville, S. C., late one afternoon, he was worried whether he could locate his prospect before closing hours. He asked Sgt. James E. Middleton, driving Car No. 6, for directions. The sergeant told him he could give directions, but everything would be closed by the time an out-of-towner drove across the city through traffic. The officer deliberated a minute, then climbed into the police car and said, "Follow me!"

Gary did—and had a fast trip to arrive before closing time and to bring another reader into the fold.

On "Isms"

Edward E. Hale from Boston-way gives these definitions of various "isms".

Communism: You have two cows; the government takes both and gives you the milk.

Nazism: You have two cows; the government takes both and shoots you.

New Dealism: You have two cows; the government takes both, shoots one, milks the other and throws the milk away.

Capitalism: You have two cows; you sell one and buy a bull.

Rolling in

Requests are pouring in for reprints of two special jobs put out by the editors upstairs—Vance Bell's financial analysis of the steel industry run Apr. 24 and John Morgan's depreciation study carried May 8—but more copies are still available. Write Readers' Service, Penton Bldg., Cleveland 13.

Interest in this 25th annual financial summary has never before been so widespread. American steel companies have always followed it closely, but this year more metalworking companies than usual want reprints.

Assembly Line Hamburgers

Now, we are going to get assembly line hamburgers. And where did mass production techniques first get applied to the great American food? In Detroit, of course. Hygrade Food Products Corp. had the brainstorm. Machines stamp out the patties, all exactly the same size and weight. The patties are carried on conveyor belts just like automobiles on the production line. They are packed into huge vaults where they are quick frozen pending delivery to stores and restaurants.

We've alerted Detroit Editor Art Allen, and he'll sample the product. He has promised to give us details on quality, quantity and price.

Puzzle Corner

One answer to the May 1 puzzle about playing cards is:

AS	KH	QD	JC
JD	QC	KS	AH
KC	AD	JH	QS
QH	JS	AC	KD

Hungry for more? Try this meat problem. Jake the butcher has a balance scale and must weigh sales from one-half to 60 pounds. All sales come to either the half or even pound. He has only five weight balances. What are they?

Are You Planning on Moving?

To make sure you get your STEEL promptly, please send advance notice of any change of address to G. R. Ebersole, List manager, Circulation Department, STEEL, Penton Bldg., Cleveland 13, Ohio.

If you clip the old label from our mailing envelope and send it in with your address change, that will help.

It's possible to have your mailing address corrected by filing your new address with the Post Office, which in turn will notify us. But if a copy of STEEL is sent before that notice reaches us, it means the late delivery of your issue.

Shrdlu

(Editorial Index—page 41)

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Next Week **... How To Reduce Heat Treating Costs with Controlled Atmospheres ... Better Weldments Through Tailored Quality Control ... How Hotpoint Fabricates Dishwasher Baskets from Stainless Wire ... Eliminating 90 Per Cent of Sulphur in Iron**

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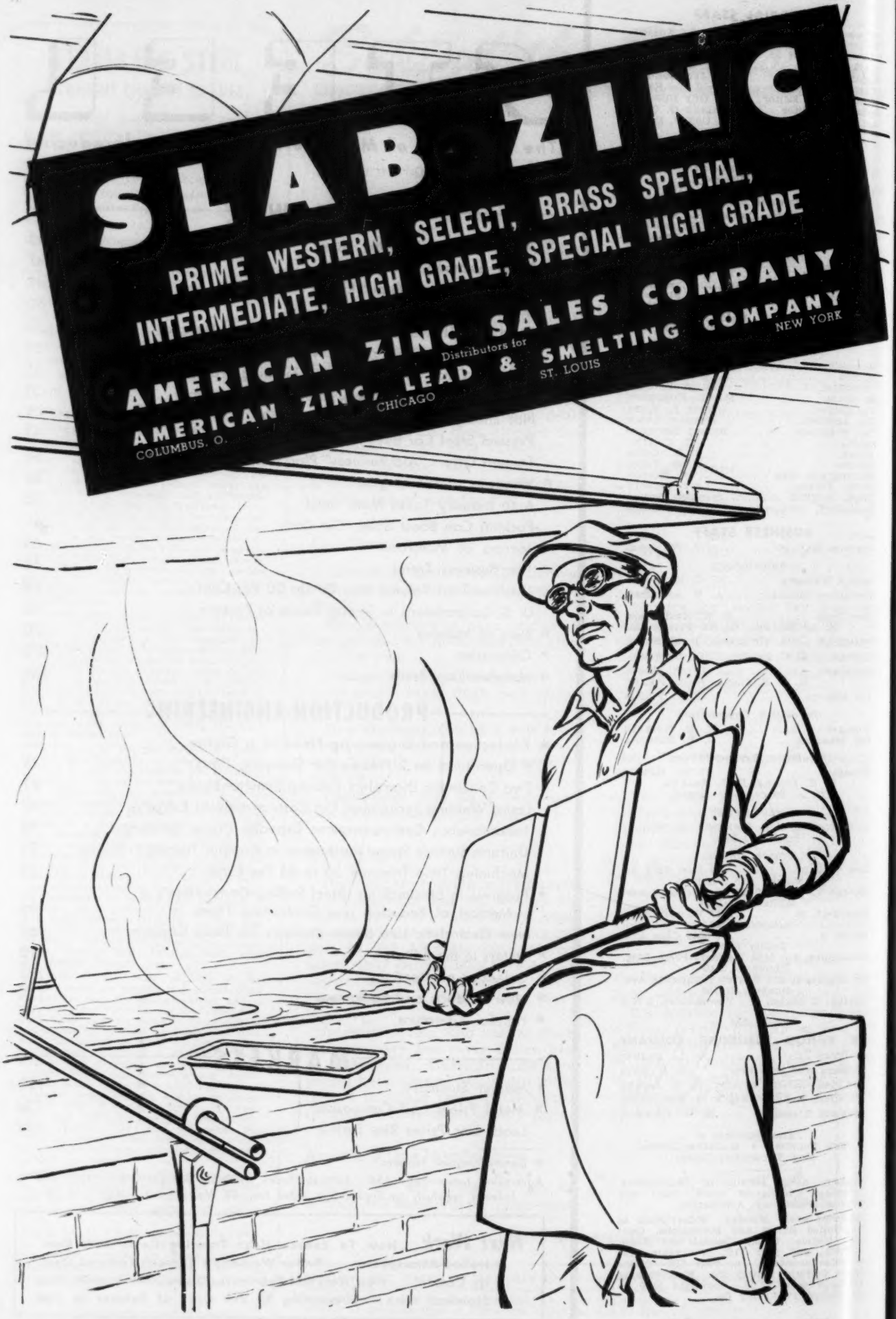
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May 15, 1950

Foundry Progress

Thousands who attended the 54th annual Foundry Congress and Show of the American Foundrymen's Society in Cleveland last week went away with the feeling that the American castings industry is entering a new stage of progress and improvement. In the equipment, services and supplies demonstrated at the show and in the scores of papers delivered at technical sessions were numerous evidences that the industry is exploring many promising new ideas for producing better castings at lower cost.

To thoroughly understand what this means, one must consider the somewhat unusual make-up of the foundry industry. It consists basically of about 6000 separate establishments in the United States and Canada. They are divided into four groups—gray iron, steel, malleable and nonferrous. They vary greatly in size. Some are captive shops, some are jobbing foundries and some are strictly production shops.

In spite of the special characteristics of individual foundries, the industry is closely knit. Each group has its own technical associations and the entire industry has its technical and trade associations. In addition to hundreds of competent metallurgists and other specialists employed by the foundries, the industry calls upon the services of numerous outside research institutions and consultants. Also catering to the industry are hundreds of manufacturers.

The dynamic characteristics of the 1950 Congress and Show reflect the heightened activities of these various groups which, with the foundries themselves, contribute to the progress of the entire industry. The real significance of new ideas introduced at the Cleveland event is that each new feature starts a chain reaction of progress. If one manufacturer introduces a machine of unusual merit, competing manufacturers are quick to bring out something to match or surpass it. If one foundryman gets a jump on the field with a new cost-saving method, other foundrymen will lose no time in trying to outdo him.

There is nothing static about the American foundry industry today. It is alert to the challenge of the postwar period. On the basis of the vision and progressiveness manifested in Cleveland last week, one is justified in believing that in the years ahead the castings industry will improve its position.

* * *

BEHIND IRON CURTAIN: Now that it has become customary and necessary to consider the troubled world as one divided into two cold war camps, the industrial resources of each assume greater significance.

According to the best information available Russia and her satellites—Bulgaria, Czechoslovakia, East Germany, Hungary, Poland and Roumania—produced about 30.5 million net tons of steel ingots in 1949. Western Allies, including the United States, Canada, Great Britain, France, Benelux, Norway and Italy, produced about 119 million tons last year. If goals announced by the Moscow government are achieved, output of steel ingots behind the iron curtain in 1955 will be about 61 million net tons.

Fuel and power also are important. The Soviet Union and her satellites except China are producing about 440 million net tons of coal and 100 billion kwhr of electricity annually. The western nations are producing about 865 million net tons of coal and 467 billion kwhr of electricity yearly.

U. S. Department of Commerce estimates Rus-

(OVER)

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sian output in 1950 will include 247,500 tons of copper, 189,750 tons of primary aluminum, 500,000 automobiles and trucks, 112,000 tractors, 2200 locomotives, 146,000 freight cars and at least 74,000 machine tools.

All of these figures, if reasonably accurate, indicate that while the Soviet Union's industrial resources fall far short of those of the western nations, they represent a potential which, if coordinated effectively, could be formidable in peace or in war. —p. 49

* * *

WHY OUTPUT IS HIGHER: Last year a team of British forge shop representatives visited American drop forge plants to study production methods. In a report of their findings they make the striking statement that American shops produce up to 400 per cent more drop forgings per hour than their counterparts in Great Britain.

The visitors attribute this wide margin in productivity partly to "acceptance by labor and management of the principle that every blow which the forging unit can deliver should be utilized for the performance of useful work." Hammer man or press operator should be "so serviced that he performs no unproductive work." Other factors include elimination of useless finishing of forgings, specialization so as to permit maximum benefits of mass production, incentives to workers, good "housekeeping," comfortable working conditions, efficient materials handling, alert maintenance and safety consciousness.

Significant is the fact that many authorities feel there is room for marked improvement in some of these factors in even the most efficient American shops. —p. 50

* * *

AUTOS USE MORE STEEL: American Iron & Steel Institute's breakdown of finished steel distribution for 1949 shows that the automotive industry broke all of its previous records as the steel industry's No. 1 customer. Motordom consumed 10,962,894 net tons or 18.9 per cent of the total of 58,104,010 tons of all grades of finished steel shipped from mills last year. Second largest customer was the warehouse industry, which accounted for 17.6 per cent of shipments. Construction and maintenance was third with 12.9 per cent, containers fourth with 8.0 per cent and rail transportation fifth with 6.3 per cent.

Warehouses took more carbon steel than any other outlet. Five leading purchasers of alloy steels other than stainless, in order of tonnage, were automotive, machinery and industrial equipment, electrical machinery and equipment, forgings (except automotive) and warehouses. Leaders in the purchase of stainless steel were automotive, warehouses, unclassified users, appliances including utensils and cutlery and converters and processors. —p. 60

* * *

CUT DOWN IDLE TIME: International Harvester Co. has installed two interesting communications systems in its recently modernized bolt, nut, rivet and screw machine product manufacturing plant at the West Pullman Works in Chicago. Traveling cranes, superintendent's offices and strategically located ground stations in an area of 254,000 square feet are equipped with trolleyphones which permit instantaneous two-way conversation between crane operators and personnel in offices or at ground stations and between crane operators themselves.

These communication facilities reduce the time lost in trying to attract the attention of crane operators by shouting or signaling. They permit more effective teamwork in all crane operations. Similar systems have been installed in a number of plants for communication between operators of soaking pit cranes, ore bridges, transfer cars, coke oven pushers and similar equipment. Two-way conversation would save time and money elsewhere. —p. 83

* * *

MAY PROHIBIT RECORDS: Is the nation drifting into the habit of resigning itself to a major new strike a few days after a major old one has been settled? The periods of peace between the steel, coal, Chrysler and railroad firemen strikes have been painfully brief.

In the latest instance, the interval of harmony between ending of the Chrysler strike on May 4 and walkout of firemen on May 10 was too short to do much good. If curtailment of service on the New York Central, Pennsylvania, Southern and Santa Fe continues long, metalworking industries will find it impossible to maintain the present high rate of operations. Before the firemen's strike, motordom envisioned weekly assemblies at the unprecedented figure of 190,000 units and steelworks were operating at 100.5 per cent of capacity. A prolonged rail strike would prohibit production of this magnitude. —pp. 50, 63, 123

E. C. Shaner

EDITOR-IN-CHIEF

News Summary

ENOUGH STEEL FOR WAR—Communist nations may be producing 61 million tons of steel annually by 1955 (p. 49). That will be only about 60 per cent of what the U. S. can produce by then, but it's still enough to fight a major war. U. S. production of 77.9 million tons in 1949 was 123 per cent above the 1913 level of 35 million tons, but the U. S. S. R.'s output of 22.6 million tons in 1949 was 402 per cent above the 1913 production of only 4.5 million tons.

THIRD MAN THEME—The rail union's demand for a third man—a second fireman on diesels of four of the nation's railroads could put a crimp in the dieselization program by offsetting diesel operating economies with higher labor costs (p. 50). Late last week the strike had not seriously affected metalworking because it was utilizing alternate rail and truck transportation.

WHAT'S AHEAD?— Despite ominous transportation problems, business prospects are excellent (pp. 66-69). STEEL's industrial production index in the week ended May 6 hit another new peak—198. Steelmaking operations last week climbed to another high mark. Machine tool output this year may be up 20 per cent over 1949. Corporations in the U. S. are in good shape financially, according to reports by the Securities & Exchange Commission. With Chrysler shooting for 42,000 auto and truck assemblies weekly, the industry's total production could reach 190,000 a week, far beyond anything ever approached (p. 64). Foundrymen, always sensitive to the general business future, say prospects are excellent (p. 51).

ROUGH ROAD—Another factor that may spur metalworking activity is roadbuilding (p. 53). The big "if," though, is: If the federal government passes adequate funds. American Road Builders Association wants the government to spend $1 billion a year on roads. That's more than any bill now before Congress provides. ARBA says our highways are wearing out at twice the rate we're fixing them.

WHO HELPS WHOM?— President Truman has given Congress a program that he says will "aid business" (p. 55). It also may "aid government" too, for the proposal would give new powers to the secretary of commerce that would boost federal paternalism to a new high. Commerce would be a clearing house to "collect and exchange engineering and managerial information." RFC would be placed under its supervision and the agency's powers broadened. Commerce would also be authorized to assist in the promotion of national investment companies.

PACKAGED PROFITS—How you can cut costs and boost sales was shown at American Management Association's packaging show in Chicago (p. 61). GE experts caution against over-packing. They advise that both suppliers and manufacturers get together to co-ordinate their packing programs to save time and materials cost.

WHERE THE STEEL GOES—The auto industry has a more commanding lead than ever as the nation's major steel consumer (p. 60). Last year it beat its own record by taking 18.9 per cent of all finished steel produced compared with 15.5 per cent in 1948. Warehouses were second, taking 17.6 per cent; construction and maintenance third with 12.9 per cent; containers fourth with 8 per cent.

HERE AND THERE IN INDUSTRY— Use of liquefied petroleum gas will jump 12 per cent in 1950 (p. 50) . . . Exhibits explaining the Croning process for making sand molds had a big play at the American Foundrymen's Society show (p. 51) . . . Industry and government are spending about $100 million a year to curb air pollution . . . Big job facing the military if there's another war will be to train civilians to perform new tasks; Defense is beginning a special educational program (p. 56) . . . Export demand for American steel is declining, but imports are increasing (p. 49) . . . Unexpectedly high demand for the automatic transmission in the Chevrolet dictates facility expansions in seven Chevrolet plants (p. 52) . . . April ingot production of 8,196,050 tons sets a new record for that month (p. 52).

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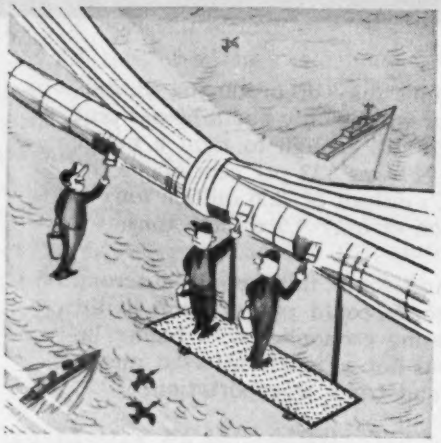

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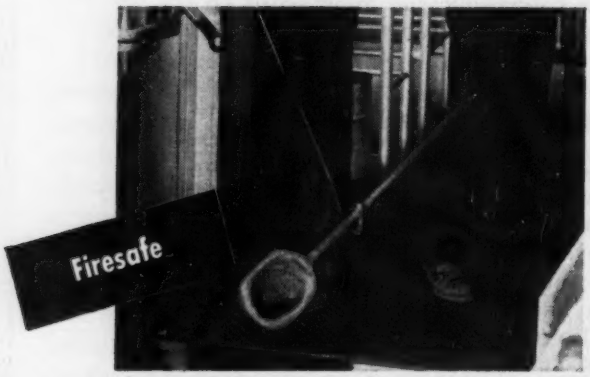

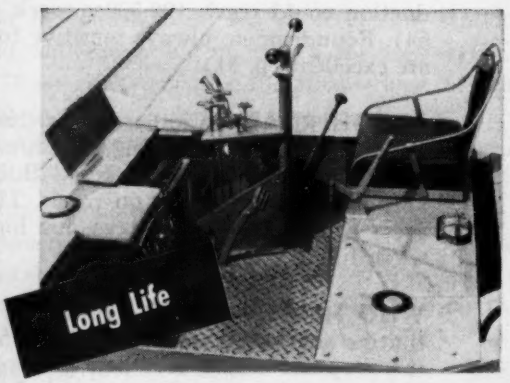

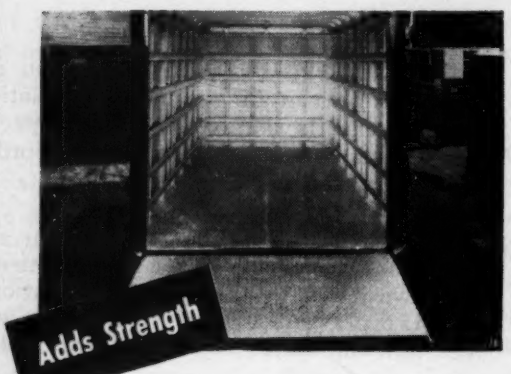

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STEEL
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Communist Steel Output Rising

Production behind the Iron Curtain may reach 61 million tons by 1955—not as much as America's but enough for a war. Russian steel output jumps 402 per cent since 1913

COMMUNIST nations will probably be producing 61 million net tons of steel ingots annually by 1955—less than America's output (see the chart) but enough to wage a first class war.

STEEL's estimate of 61 million tons is based on future production goals announced by the Reds and on past output figures obtained by STEEL's European representatives from T. Rollman, director of the Power & Steel Division of the Economic Commission for Europe. He says his statistics "are virtually exact."

The Steel Curtain — Broken down, here's the steel production picture (in millions of net tons) for Russia and her satellites:

	Best Year Before 1945	1949	1955
Bulgaria	0	0	0.01
Czechoslovakia	2.8 (1944)	3.2	3.9
East Germany	2.0 (1943)	0.8	2.2
Hungary	0.8 (1942)	0.9	1.7
Poland	2.8 (1943)	2.5	5.0
Roumania	0.4 (1943)	0.5	1.4
U.S.S.R.	20.7 (1939)	22.6	46.9

Russia, alone, will be producing 66 million net tons of steel ingots by 1960, say her leaders. Even that will be well below the U. S. potential of perhaps 110 million tons by then and will be far below the production of all Atlantic Pact countries. In 1949, the Western Allies produced about 119 million tons.

The Big "If"—Although America's steel capacity is comfortably ahead of Russia's, consider this: U. S. production of 77.9 million tons in 1949 was 123 per cent above the 1913 level of 35 million tons, but the U.S.S.R.'s output of 22.6 million tons in 1949 was 402 per cent above the 1913 production of only 4.5 million tons. If Russia can produce the 60 million tons she claims she can by 1960, her output will have risen by 1233 per cent since 1913. If we have a 110-million-ton capacity by 1960, our potential will have risen by 214 per cent since 1913.

Besides steel, here's how the East and the West compare in other industrial areas: The U. S., Canada, Great Britain, France, Benelux, Norway and Italy are now producing about 865 million net tons of coal and 467 billion kwhr of electricity yearly. The Soviet Union and all satellites except China are producing 440 million net tons of coal and 100 billion kwhr of electricity annually.

Good Guesses—The U. S. Department of Commerce believes that the Russians in 1950 will probably produce: 247,500 tons of copper, 189,750 tons of primary aluminum, 4 million tons of manganese ore, 500,000 automobiles and trucks, 112,000 tractors, 2200 locomotives, 146,000 freight cars, at least 74,000 machine tools.

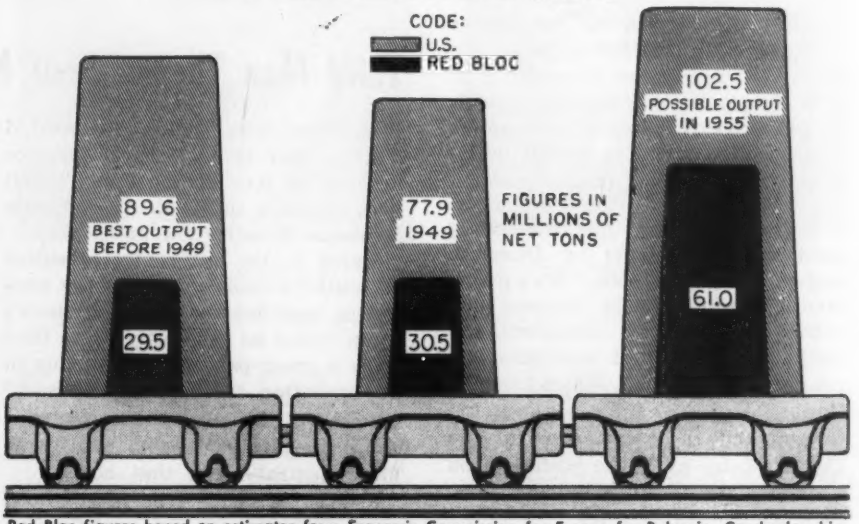
Those figures may be exceeded in 1951 because the Soviets are preparing a new five-year plan to start next year. It will run through 1955 and will be the fifth plan. While nothing has been announced about it except that there will be one, it is expected to blueprint a tremendous program of investment in industry, transport and agriculture.

More Out of the Ground—The plan probably will emphasize increased production of raw materials. Coal has been a bottleneck in Soviet production plans although last year the U.S.S.R. probably dug 260 million tons. More iron ore is also needed. Russia probably has access to at least 6060 million tons of the material (see STEEL, Apr. 17, p. 47). Richest and largest deposit is in the Krivoy Rog district of the Ukraine.

The fourth five-year plan—it ends this year—saw Russia move into second place in world industrial rank. The Soviet Union edged past Great Britain in 1948 in steel production and now has a commanding lead in most types of industrial output.

U. S. Produces More Steel Ingots Than Red Bloc

. . . But Communists are gaining



Red Bloc figures based on estimates from Economic Commission for Europe for Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Roumania and U.S.S.R.

American Steel Exports Declining, but Imports Are Up

EXPORT demand for American steel is declining and no improvement is in sight. But steel imports are increasing.

Arrivals are not large compared with the tonnage produced and consumed in this country, but they are making some impression along the Eastern Seaboard, especially because of the lower prices asked. Imports are largely in bars, light shapes and wire products such as rods and nails.

Low Prices—One eastern consumer bought 3000 tons of wire rods at $62.00 per ton, duty paid, on cars at New York city. That's about $20 under the domestic market price at New York. Steel imports would be even higher if badly needed items, such as sheets, could be supplied from overseas sources. Actually, bands are about the only flat products being received.

America's steel exports would be higher if we could supply more sheets and tin plate to foreign consumers. We cannot. That factor, plus the dollar shortage, is crimping the trade;

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only France, Italy and one or two other European countries have the necessary dollars — and they have them because of ECA funds.

Europe Moves In — Outside of Europe, America's steel exports are hit by still another factor: European competition for foreign markets, particularly in South America, is increasing. Argentina is a big buyer of tin plate, but it now gets most of what is uses from Britain. Brazil's growing needs are being met in part by new tin plate producing facilities of its own.

U. S. Forges More Productive

The American forge produces up to 400 per cent more forgings per hour than its British counterpart, says a team of British drop forgers which has just reported on its tour of the U.S. drop forging industry.

Greatest factor in achieving high productivity in America, the team found, "has been the acceptance by both labor and management of the principle that every blow which the forging unit can deliver should be utilized for the performance of useful work, and the team recommends that British drop forgers should accept this principle of maximum machine utilization to the full."

Other factors making for higher productivity in the United States, the team found, are the elimination of useless finishing of forgings, specialization on certain lines of forgings in individual plants to permit maximum benefits of mass production, provision of attractive incentives to workers, maintenance of good order in plants by thorough housekeeping methods, keeping plants comfortable in summer and winter and improved equipment and methods. The report especially appreciated the values which develop through understandings between the forgers and their customers in the United States as to the quality to be furnished and the effect of this quality upon the selling price.

"Mechanical handling is an important factor; the American dictum is not to put anything on the floor, as somebody must be paid to pick it up," says the report. It finds that larger hammers produce forgings with fewer blows and with less wear and tear. Use of high pressure water jets for descaling improves quality of finish of the forgings. Elimination or reduction in the use of lubricant increases die life, as also does the use of multi-impression dies.

Copies of the report may be obtained by writing to Economic Cooperation Administration, Information Division, 800 Connecticut Ave. N. W., Washington.

LP Gas Use Rises

And so do sales of domestic appliances using the fuel, LP gas group hears

DOMESTIC users of liquefied petroleum gas will increase consumption 18 per cent this year, and overall use will be 12 per cent higher, National Petroleum Council predicts.

Last year the industry sold an all-time record of 2.7 billion gallons of LP gas, up 8.5 per cent from 1948, Si G. Darling, of Darlingas Inc., Pratt, Kans., reported at the Chicago convention of the Liquefied Petroleum Gas Association. Mr. Darling is LPGA president.

Expanding Gas—The industry has 6.5 million customers, or one out of every five gas-using families. Of all gas ranges made last year, 25 per cent were LP gas-fired. Twelve per cent of the water heaters and 11 per cent of the floor furnaces manufactured for use with gas were LP units. In addition to domestic uses, LP gas has widening application in other fields—motive power for busses and trucks and power producers for off-the-highway construction equipment.

George W. Gray, vice president of Verkamp Corp., Cincinnati, suggests improvements in LP gas-using equipment. He admits that some of his ideas may already be used by certain manufacturers and that other features may be impractical for good reasons not known to him. He suggests:

Heavier Valves — Valves of light construction in small portable cylinders do not hold up well under vibration of filling and handling. Frequent repairs are needed to prevent leakage. Valves which are handled by the public should be of extra-rugged construction and clearly marked with on-off instructions. Warning tags instructing against indoor storage should be attached to cylinders.

Gages—A gage giving notice when the cylinder is nearly empty might make it possible for distributors to serve users with only one cylinder instead of the customary two.

Cylinder Regulator—If a small regulator were built into the cylinder, need for expensive cabinet installation might be eliminated. Operation of such a regulator could be checked when the cylinder is refilled, for a saving in field service calls.

Price competition has brought about some cheapening in regulator quality. Capacities may be too limited; mechanical difficulties are noted.

Third Man Theme: Sour Note in Rail Dispute

THE Third Man Theme that started a strike May 10 by 18,000 locomotive firemen on four of the nation's rail lines sounds a sour note in American railroads' dieselization program.

Harry A. De Butts, vice president of Southern Railway, one of the lines struck, says demands of the firemen's union would be "so costly as to take away a great part of the economy in the operation of diesel locomotives." Officials of the other lines affected—Santa Fe, Pennsylvania and New York Central—echo that belief.

Featherbedding?—The brotherhood wants a third man—a second fireman—in the cab of multiple-unit diesel-electrics. Railroads say that's not necessary. Their opinion is supported by findings of two presidential boards that studied the same problem in the past.

Indicative of the extent railroads are dieselizing is this: In February, locomotive makers had unfilled orders to build 1099 units other than steam (mostly diesel) and only 12 steam engines. The four railroads affected directly are among the most dieselized in the country.

Big Loads — The four carry more than a third of the nation's rail passengers and a fifth of the rail freight. Late last week U. S. industry was "getting by"—but that's all—with alternate rail and truck transportation. T. I. Phillips, vice president in charge of Westinghouse Electric Corp.'s East Pittsburgh, Pa., works, says that if the rail strikes were to continue "for any length of time it would seriously affect 40 per cent of the plant's incoming and outgoing shipments."

Steel Employment Rises

Steel industry employment in March was the highest since last June and payrolls are the highest since April, 1949, American Iron & Steel Institute reports.

Total payroll in March was $189,964,000, compared with $174,723,000 in February and $207,152,000 in March, 1949, when the production record was set. The total number of employees in March was 615,600, compared with 613,400 a month earlier and 651,700 a year earlier.

Payments to wage earners averaged $1.697 an hour in March, compared with $1.704 in February and $1.685 in March, 1949. Wage earners worked an average of 38.8 hours a week in March, the same as in February, and compared with 40.6 in March, 1949.

Good Omen: Foundries Active

You can expect brisk metalworking business through rest of year if castings output is accepted as business barometer, say visitors and exhibitors at AFS Congress and Show

TALK among foundrymen, their suppliers and equipment makers is happy these days. The casting shops have snapped out of the doldrums which beset them much of last year. Some say April business established new records—higher than wartime. Practically all agree that business and prospects are "very good," the exceptions generally are shops whose customers' shops are having labor troubles.

This is the picture gained by visitors to the 54th annual American Foundry Congress and Show in Cleveland May 8-12.

All types of foundries—steel, gray iron, malleable and nonferrous—are sharing in the uptrend.

No Time for Show—Although attendance at the show was large, estimated at 11,500, many foundrymen and suppliers had to cut short their Cleveland visit to return to their shops due to pressure of business.

Suppliers say foundries are buying heavily not only for current use but to build up inventories in anticipation of continuing high activity.

Good Omen—Casting production is a sensitive business barometer, say economists. A slump in casting output often precedes a general recession by several months. Foundries were hard hit in the winter of 1948 by the recession which did not appear in most metalworking lines until the spring of 1949.

Current high operations in the casting shops is interpreted by foundrymen as indicating a continuing high level of metalworking business through 1950 and even through the first half of 1951.

More Automaticity — Greater emphasis on materials handling equipment and a trend toward more automatic controls and devices is apparent in the new equipment displayed.

Attracting particular attention is a mold blowing machine capable of producing 350 half molds an hour. This is largely a push button operation. Patterns lift off, can be changed in 30 seconds.

Small foundry operators are interested in a new, compact sand reclamation unit. Small and low in price, this unit makes possible reusing sand 100 times or more. It gives the small shops sand reclamation service about equal to that of the big units previously supplied for the large production foundries.

Recent crusades against air pollution heightened interest in a dust collecting system manufactured under a Swedish patent. Equipment uses no filters, precipitates dust from the air through a metal cone.

Several companies exhibited improved casting cleaning devices using a sand and water mix under high pressure.

Woody New President—Walton L. Woody, vice president, National Malleable & Steel Casting Co., Cleveland, is new AFS president. Walter L. Seelbach, president and general manager, Superior Foundry Inc., Cleveland, is vice president.

Directors are: J. J. McFayden, general manager, Galt Malleable Iron Co., Galt, Ont.; J. O. Ostergren, president, Lakey Foundry & Machine Co., Muskegon, Mich.; Frank W. Shipley, foundry manager, Caterpillar Tractor Co., Peoria, Ill.; James Thomson, chief engineer, Continental Foundry & Machine Co., East Chicago, Ind.; E. C. Troy, foundry engineer, Palmyra, N. Y.; Martin J. O'Brien Jr., works manager, Symington - Gould Corp., Depew, N. Y.; and Edwin W. Horlebein, Gibson & Kirk Co., Baltimore.

WALTON L. WOODY

WALTER L. SEELBACH

. . . president and vice president of American Foundrymen's Society

Finishing Costs Cut by Precision Molding Process

BETTER quality precision metal castings with accurate dimensions and smooth surfaces may result from a new low cost process of making sand molds and cores using plastic resin binder. Just how much impact the method will have on current founding practices remains to be seen.

The molding process is still in the experimental stage. It is not new (STEEL, Apr. 10, p. 65).

But it did attract a lot of attention at last week's foundry show in Cleveland.

Simple Enough—Known as the "Croning" or "C" process, the method consists essentially of dumping a mixture of dry sand and finely powdered phenolic resin against a hot metal pattern. Heat of the pattern softens the plastic, causing it to conform to the pattern shape while forming a continuous surface coating.

The pattern, with the sand and resin coating still intact, is baked in a gas-fired oven for a few minutes. The resulting dry, porous mold, about ⅛-inch thick, is then stripped from the pattern by means of knock-out pins.

Hollow cores are made in about the same way.

The mold is poured in a vertical position. In casting thin aluminum sections, mold halves are merely clamped together. For heavier metals, the thin mold is surrounded by steel shot or other bedding material to help it withstand hydrostatic pressure of the liquid metal;

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air and gases escape through the highly permeable mold.

Smooth Job — Aluminum, brass, bronze, iron and steel castings weighing up to 50 pounds can be made by the process. Castings are reported to have very smooth finishes, extremely accurate dimensions with tolerances of a few thousandths of an inch possible. Sections as thin as 1/10th-inch can be cast. Cleaning and finishing operations are reduced to a minimum.

The process of making cores requires simple, inexpensive machinery. Since only about 5 per cent of the usual amount of sand is used, sand handling problems are greatly reduced. Only a fraction of the usual floor space is needed because the method uses smaller molds which are poured in an upright position.

Education Group Officers Picked

Claude B. Schneible, president, Claude B. Schneible Co., Detroit, was elected president of the Foundry Educational Foundation at its third annual meeting in Cleveland, May 8. Other officers elected are: Vice president, C. R. Culling, president, Carondelet Foundry Co., St. Louis; secretary-treasurer, Charles A. Barnett, president, Foundry Equipment Co., Cleveland.

George K. Dreher continues as executive director.

CLAUDE B. SCHNEIBLE
. . . of Foundry Educational Foundation

Boon to Equipment Makers: Chevrolet Expansion

BUSINESS OPPORTUNITIES for industrial equipment makers, particularly machine tool producers, arose with announcement last week by General Motors Corp.'s Chevrolet Motor Division that it will start immediately to expand its facilities to double production of its Powerglide transmission.

The program will increase facilities in seven Chevrolet plants which contribute parts to the transmission. Manufacturing in Cleveland, Flint, Detroit, Saginaw, Bay City, Buffalo and Toledo will be affected. At the Cleveland plant where the unit is assembled 1050 employees will be added to payrolls.

Powerglide production is now more than 1000 a day on a two-shift basis. Eventual objective is 2000 units a day. The step-up in Powerglide operations will be gradual, with completion of the program dependent on how quickly suppliers can deliver equipment.

Commenting on the expansion, T. H. Keating, general manager of Chevrolet and a GM vice president, says: "Success of the automatic transmission in the hands of Chevrolet owners has created a rush of business that we did not anticipate when we introduced new model test cars in January. Our bank of unfilled orders necessitates an increase in production as soon as possible." Chevrolet already has turned out 70,000 automatic transmissions.

Hubbard Speaks at GM Meeting

Delco-Remy Division, General Motors Corp., played host at Anderson, Ind., May 7 to 300 guests, including the Muncie, Ind., chapter, American Society of Tool Engineers, and operators and supervisors of the Delco-Remy manufacturing departments.

R. M. Critchfield, general manager, welcomed the visitors to this luncheon meeting. Guest speaker was Guy Hubbard, machine tool editor, STEEL magazine, on "Impact of Revised Metalworking Methods on Machine Design and Tooling."

Mr. Hubbard says increasing costs and growing shortages of metals—including steel — emphasize need for production methods that will get more material into the work and less into the scrap bin. There is growing tendency to do primary operations by systems which shape parts by "pushing the metal into shape" rather than whittling it away in the form of chips. Machine tool operations then are confined to final operations demanding high accuracy and fine finish.

Sheet Shipments Increase

March steel shipments, totaling 5,723,000 tons, included record tonnages of cold-rolled sheets and galvanized sheets.

Cold-rolled sheet shipments were 782,686 net tons, 13.7 per cent of total shipments, while shipments of galvanized sheets were 207,469 tons or 3.6 per cent of the total. Both items were higher than ever before, both in tonnage and in percentage. Shipments of 634,539 tons of hot-rolled sheets and 222,000 tons of electrolytic tin plate were high but have been exceeded.

Steelmakers Set New Record

New record for April production of steel for ingots and castings was set last month. Outturn of the nation's steelmaking furnaces was 8,196,050 net tons, the American Iron & Steel Institute reports.

That total was more than 700,000 tons higher than steel companies made during March and about 400,000 tons higher than the figure for April, 1949.

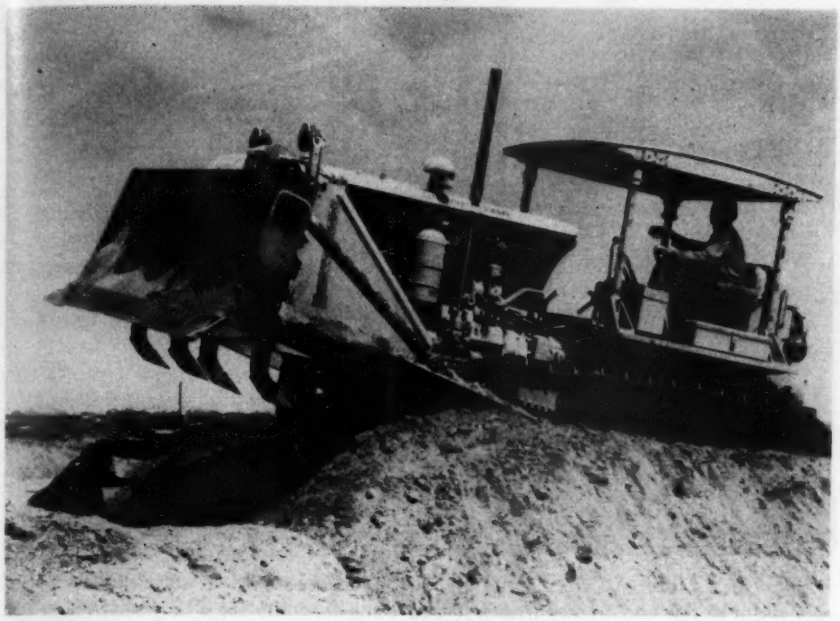
Steelmaking furnaces operated at an average of 100.2 per cent of capacity during April, compared with 88.7 per cent in March, and 98.6 per cent in April, 1949.

Although April was the third month in history in which output exceeded 8 million tons, the production of 30,406,703 tons in the first four months of this year is about 1,483,000 tons below the output of the first four months of 1949.

Alltime April Record Set by Steel Output

Period 1950	—Open-hearth— Net Tons	% Capac.	—Bessemer— Net Tons	% Capac.	—Electric— Net Tons	% Capac.	—Total— Net Tons	% Capac.	Calculated Net Tons Weekly	No. weeks in mo.
Jan.	7,131,519	96.5	379,252	80.6	419,601	71.9	7,930,372	93.9	1,790,152	4.43
Feb.	6,142,178	92.0	255,565	60.2	395,502	75.0	6,793,245	89.1	1,698,311	4.00
*Mar.	6,747,680	91.3	265,726	56.5	473,630	81.1	7,487,036	88.7	1,690,076	4.43
*1st Qtr. .	20,021,377	93.3	900,543	65.9	1,288,733	76.0	22,210,653	90.6	1,727,111	12.86
Apr.	7,301,284	102.0	407,909	89.5	486,857	86.1	8,196,050	100.2	1,910,501	4.29

Note—The percentages of capacity operated are calculated on weekly capacities of 1,668,287 net tons open-hearth, 106,195 net tons bessemer and 131,786 net tons electric ingots and steel for castings, total 1,906,268 net tons; based on annual capacities as of January 1, 1950 as follows: Open-hearth 86,984,490 net tons, bessemer 5,537,000 net tons, electric 6,871,310 net tons, total 99,392,800 net tons.
* Revised † Preliminary figures, subject to revision.



SCARIFYING: Back rip scarifiers, mounted on the back of bulldozer moldboards, are used eight hours a day in stripping and dozing operations in the California desert. The rippers, made by Preco Inc., Los Angeles, Calif., are used for pioneer road building and for ripping tufa rock, cemented gravel, black top, decomposed granite, hard clays and caliche. The scarifiers rip the ground when tractor backs up, float on top of ground when it moves forward

Not Enough Roadbuilding Being Carried On

That's the word from American Road Builders Association. It says 40,000 miles of highway wear out each year and are being repaired at a 20,000-mile-a-year clip

THAT rough stretch of road a few miles from your house will cost $10,000 to fix, but the sum may be spent seven or eight times—much of it for road building apparatus, transportation equipment and steel—before the pavement is repaired.

Roadbuilding is a boost to metalworking activity, but the catch is that not enough road work is being done. The stretch near you may not be touched for another year. American Road Builders Association says existing highways have been wearing out at the rate of 40,000 miles a year, but road construction has been at the rate of 20,000 miles a year. ARBA believes new construction completed in 1949 brought our highways up to where they should have been in 1933. Car and truck registrations may reach 45 million by the end of this year, a 50 per cent increase since before the war.

What's To Be Done? — Whether $1.5 billion or twice that amount will be spent for road construction in each of the fiscal years 1952 and 1953 soon will be decided by Congress. In the House, the Whittington bill is on the calendar with the blessings of the Public Works Committee. In the Senate, the Public Works Committee is to start hearings on the Chavez bill on May 17.

These bills show two extreme views about the right amount of federal aid to be extended. The Whittington bill would provide $550 million of federal money a year which, adding matching funds from the states, and an approximately equal amount for work to be done without federal aid, would mean an annual road building program of $1650 million. The Chavez bill calls for federal aid in the amount of $961 million, and would make for an annual road building program of $2.5 billion.

They Want More — The American Association of State Highway Officials has plumped for $810 million of federal aid annually, and the American Road Builders Association for $1 billion annually. Both groups declare the $500 million called for in the President's budget message, and the $550 million in the Whittington bill, are insufficient.

The Joint (O'Mahoney) Committee on the Economic Report estimates that it would now cost $41 billion to remedy existing deficiencies in the nation's highway system. It says that if such a remedial program were to be carried out on a ten-year basis, the figure for deficiencies would have to be increased to $55 billion before the end of the period because of additional deficiencies that would develop in the meantime. On the basis of the O'Mahoney report, an adequate road building program would come to $5.5 billion a year for ten years. That amount would require at least $2 billion of federal aid annually.

Sales Ahead?—To the metalworking industry, the coming decision by Congress will determine whether road equipment building companies will sell $325 million worth of their products in 1952 and again in 1953—or up to twice that amount. These figures probably err on the conservative side, for they are based on calculations made in 1935. The figures cited cover all equipment — bulldozers, large earth-movers, trucks, cranes, power shovels, draglines, crushers, screening equipment, conveyors, pumping equipment, culvert and bridge equipment, tractors, bituminous and concrete paving apparatus, drilling equipment, graders, scrapers, etc.

How about the effect of higher costs on the road building outlook? Public Roads Bureau says costs have come down from their postwar peak and now stand at about 140.7 on the basis of 100 for the period 1925—1929.

The bureau thinks the increase in road construction costs is not excessive when compared with the general rise in prices.

An angle mentioned by opponents to a big road construction program is the shortage of highway engineers in the state highway departments of the nation.

About half the states, because of insufficient technical men, have found it difficult to take full advantage of the $450 million of federal aid authorized for the fiscal years 1950 and 1951.

Fine Point

It may be because of cold shots, it may be because of penicillin but whatever the reason, it's a fact that 20 million hypodermic needles are made each year from the smallest of stainless steel tubes.

American Iron & Steel Institute says the tubing is drawn in a series of operations through diamond or carbide dies to an outside diameter of 14/1000 of an inch for one of the finer standards. The hole in the tube remains accurately centered and may be reduced to a diameter as small as 46/10,000 of an inch —about the diameter of a human hair.

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Three Metal Plants Sold

Operating as divisions of Pressed Steel, they are expected to add $3 million to sales

PRESSED STEEL CAR Co. Inc., Chicago, acquired three steel products manufacturing companies.

The companies bought were: Rice & Adams Corp., a Buffalo producer of milk-can washing and dairy equipment; C. R. Jahn Co., Savanna, Ill., maker of heavy-duty low-bed truck trailers; and Erie Mfg. Co. Inc., Chicago, one of the oldest and largest manufacturers of automobile radiator grille guards.

A Pressed Steel spokesman in New York says the latest acquisitions are expected to add an estimated $3 million sales revenue to the company's 1949 gross of $41.3 million. The firms will operate as autonomous divisions of Pressed Steel. The present distribution setups and facilities of the three companies will be maintained under the new management.

The cash transactions included most of the assets of the three companies, excepting their buildings and real estate. Pressed Steel is well situated with properties; it has large plants in McKees Rocks, Pa., Mt. Vernon, Ill., and Chicago. C. R. Jahn Co. will soon move its headquarters to the Mt. Vernon plant.

Nat'l Lift Buys Nat'l Truck

National Lift Co., wholly owned subsidiary of Gar Wood Industries Inc., Wayne, Mich., acquired the assets of National Truck Equipment Co., Waukesha, Wis. E. F. Fisher, president of Gar Wood, made the announcement.

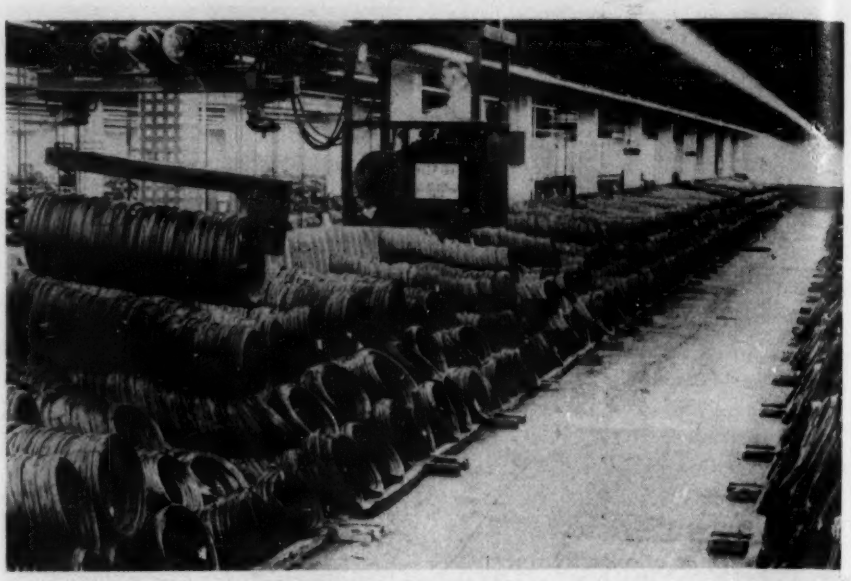
Gar Wood will add these products to its line of hydraulic hoists and truck equipment: Twin hydraulic hoists called the Dump-O-Matic for pick-up trucks; a twin hydraulic hoist called the Jumbo for 1½ and 2-ton trucks; a fan-belt driven hydraulic pump with a self-contained clutch called the Hydra-Clutch pump; and a hydraulic tailgate loader called the Lift-O-Matic for pick-up trucks.

Manufacture of the products will be continued at Waukesha by National Lift Co.

Revere Gets Clinton, Ill., Plant

Revere Copper & Brass Inc., New York, acquired a plant in Clinton, Ill., for production of Revere Ware copper clad stainless steel cooking untensils. C. Donald Dallas, chairman of the board of Revere, made the announcement.

The plant, he says, will be in operation by September, 1950. It was formerly occupied by Goodyear Footwear Corp. and consists of 65,000 sq ft and 48½ acres of land. An addition is planned. Revere is placing itself in position to complete deliveries in less than one-half the time formerly needed, thus eliminating costly rail hauls on finished and raw material, Mr. Dallas says.



THREE-YEAR MIGRATION: When it was unable to find a suitable site for a new plant in the community where it had done business for 112 years, American Screw Co., Providence, R. I., decided to move. After three years of gradually moving all of its functions and personnel to Willimantic, Conn., the company is now completing its "shakedown" at its new location. The move was made slowly to keep from disrupting service to customers. Production is steadily moving upward in all types of American Phillips and slotted fasteners. Among its array of modern equipment is this crane handling wire in the storage department

$118 Million Project Planned

Texas Eastern Transmission Corp. applied to the Federal Power Commission for permission to build a new 791-mile pipeline 30 inches in diameter to supply up to 476,400,000 cu ft of natural gas per day to New England and the company's present customers in the Appalachian and seaboard areas. Cost of the project is estimated to be $117.8 million.

Warehouse to Mapes & Sprowl

Sale of the assets of the Newark, N. J., warehouse of Edgar T. Ward Sons Co. Division, Pittsburgh, is announced by E. L. Parker, president.

Mapes & Sprowl Steel Co., Union, N. J., bought the assets and continues in business without interruption at the Ward location, 400 Freylinghuysen Ave., Newark. The company will be exclusive distributor in the New York metropolitan area of products of Columbia Steel & Shafting Co. and Summerill Tubing Co., affiliates of Ward. Mapes & Sprowl has been in the warehouse business for 25 years in other product lines.

Bath Iron Acquires Dixie

J. W. Schulze, vice president of Bath Iron Works Corp. and president of Pennsylvania Iron Works Corp., announces the purchase of all outstanding capital stock of Dixie Machinery Mfg. Co., St. Louis, by Bath Iron Works through its subsidiary, Pennsylvania Crusher Co., Philadelphia.

The Dixie company was organized in 1918 and manufactures special hammermills for cement mills and for the feed, road, quarry, bauxite, ceramic and other industries.

Ore Carriers To Be Repowered

Contracts for repowering two of the Pittsburgh Steamship Co.'s present Great Lakes ore-carrying vessels were awarded to American Ship Building Co., Cleveland.

The repowering installations involve two vessels, the steamers *Eugene W. Pargny* and *Homer D. Williams*. The Lima-Hamilton Corp., Hamilton, O., will furnish a 3000 shaft hp diesel engine to replace the present power unit aboard the *Pargny*. The *Williams* will be repowered with a steam turbine of 3000 shaft hp, contract for which was awarded to General Electric Co. Foster-Wheeler Corp. will supply the two boilers.

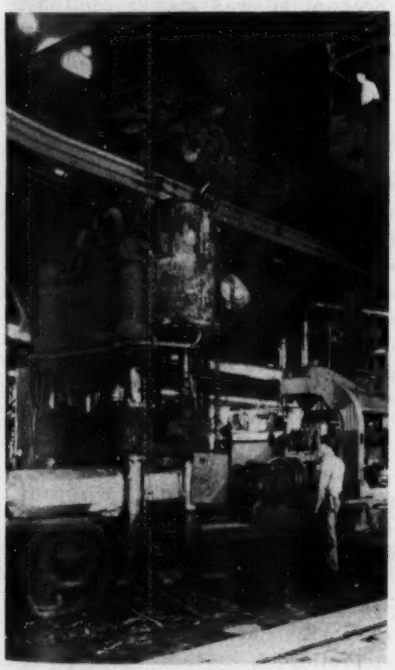
Toolmakers Start Credit Facility

An organization to handle credit facilities for 17 machine tool manufacturers, seven of them in Cincinnati, was announced in that city. A maximum revolving fund of $1.5 million is contemplated, with co-operation of the Export-Import Bank, for sales in Central and South America, Mexico and Caribbean areas.

The plan will be operated through the newly organized Machine Affiliates Trading Corp., capitalized at $250,000 and located in Cincinnati.

These memberships were listed: R. K. LeBlond Machine Tool Co., Cincinnati Bickford Tool Co., Cincinnati Electrical Tool Co., Cleveland Automatic Machine Co., Elmes Engineering Division and King Machine Tool Division of American Steel Foundries, and G. A. Gray Co., all of Cincinnati.

Lima-Hamilton Corp., Hamilton, O.; American Broach & Machine Co., Ann Arbor, Mich.; Gallmeyer & Livingston Co., Grand Rapids, Mich.; George Gorton Machine Co., Racine, Wis.; Gould & Eberhardt Inc., Irvington, N. J., Lucas Machine Division, Cleveland; Racine Tool & Machine Co., Racine, Wis.; Reed-Prentice Corp., Worcester, Mass.



PRESSING TASK: An overhead crane in the forge shop of National Supply Co.'s Torrance, Calif., plant serves this 1500-ton press about to forge a billet. Two presses (the other is a 1200-ton job) are served by an 11-ton manipulator and two heavy-duty overhead cranes that make up National's new press forge department. Here, the crane operator is working with the manipulator

Truman Presents an "Aid Business" Plan

If approved by Congress it may be more an "aid government" plan because it will increase federal paternalism. Proposal would give commerce secretary more power

PRESIDENT Truman has submitted a program for financial and other assistance to "small" business that, if approved by Congress, may give government an even stronger toehold on all business. In the federal view, "small" businesses means all those that are not outstanding leaders in their industries—well over 95 per cent of all firms and corporations.

Sired by Henry Wallace when he was secretary of commerce, the proposal would give new paternal and supervisory authority to the Commerce Department. Under the plan the secretary of commerce would establish a "clearing house" to "collect, disseminate, and exchange scientific, engineering, and managerial information." He would "undertake research on technical problems of small business, including developmental work on new products and processes." The secretary "would apply in the business field some of the lessons we have learned through our long and successful experience in promoting the use of modern methods in agriculture."

More Power—The Reconstruction Finance Corp. would be placed under the supervision of the secretary of commerce who would handle both financial and nonfinancial aids to business. This latter proposal is all the more significant because of proposals to broaden the lending powers of the RFC. To permit RFC to function on any desired scale in some future crisis, the agency would be given wide discretion as to collateral requirements for loans, would be permitted to increase its participation with private banks on business loans, and would be enabled to approve loans for maturity in 15 years instead of ten as at present.

In addition, the secretary of commerce would be authorized to assist in the promotion of national investment companies, and to advise the Federal Reserve Board of Governors on "how the investment companies can best contribute to accomplishing the objectives of the government's small-business program."

Tax Benefits—Otherwise the program is along the lines of the preview in STEEL of Mar. 27, p. 37. The investment companies—probably at least one in each Federal Reserve district—would be owned by private investors or institutions, with the Federal Reserve System supplying funds at the start to get the ball rolling. These investment banks would receive special tax treatment to attract investors. Their function would be to provide equity capital and make long-term loans to small business in general, and furnish managerial and technical services necessary to enable companies to stay, or become, sound.

Another proposal in the program calls for a federal system of insurance for all bank loans up to $25,000—so as to encourage banks in general to make small business loans.

No Action Now—The program now is in the hands of the House and Senate Committees on Banking and Currency. The Senate committee proposes to hold hearings in June but general expectation is that serious consideration will be held over until the next session of Congress.

Carnegie Gets New Ore Bridge

A new ore bridge that can handle well over a million tons of iron ore annually will be built at the Homestead district works of U. S. Steel's Carnegie-Illinois Steel Corp.

The big bridge will be used to stock iron ore and transfer it to blast furnaces at the company's Carrie furnaces across the Monongahela river from the main plant. The stacks supply the molten iron used in the open-hearth furnaces at Homestead. Latest developments in ore bridges will be incorporated in the new unit.

Udylite Will Buy Stevens Inc.

Stockholders of Udylite Corp., Detroit, approved a proposal to acquire Frederic B. Stevens Inc. as a wholly owned subsidiary.

An agreement was reached between the officers of the two companies last January, but formal consummation was withheld until the proposal could be voted upon by stockholders of both companies. Stevens is also a manufacturer of foundry supplies and polishing and buffing compounds. Udylite has five plants in Detroit; Stevens operates plants in Detroit, Buffalo, New Haven, Conn., and two wholly owned subsidiaries have plants at Windsor, Ont., and Springfield, O.

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Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

The job of training specialists to train trainers if there's another war is the task facing the Research and Development Board. Making training aids may become big business

ONE of the biggest tasks facing the military if there's another war will be the job of training industrialists and civilians to perform new tasks. So the training job may be started and be in operation in a big hurry if the need arrives, the Defense Department is beginning a special educational job. It'll be of far reaching character and—in essence—a job of training now the specialists who will serve as trainers of trainers in war.

Master Plan—In charge of the task is Dr. Leonard C. Mead, research coordinator, Tufts College. He was made chairman of the newly created Joint Panel on Training and Training Devices of the Research and Development Board, Defense Department.

He and his panel are to organize a master plan for improving and expediting training programs in general. Their assignment, says William Webster, chairman of the Research and Development Board, is to:

". . . Concern itself with research and development on new and improved procedures in training and education, including the learning process, curricula, teaching and training methods, and grading systems; efficient methods of training in the use of operational equipment; special devices including synthetic trainers, mechanized evaluators and simulated operational systems; and training aids including films, slides and associated equipment, graphic aids and tridimensional aids such as mock-ups and models.

It sounds like a difficult assignment—and it is. It covers everything from the production of a guided missile part to civilian defense. An enormous amount of training will be required for the accomplishment of operations requiring highly specialized knowledge.

For Atomic Days—First of the courses began at Brookhaven National Laboratory, Brookhaven, N. Y., Oak Ridge National Laboratory, Oak Ridge, Tenn., and University of California, Los Angeles. There are courses in radiological monitoring which, in these atomic days will probably be done on a gigantic scale if there's another war.

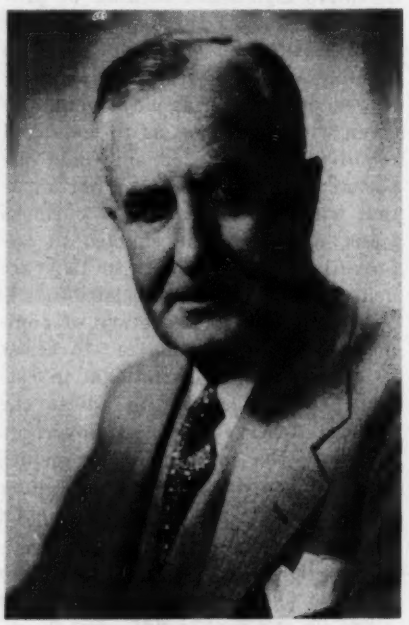
Paul J. Larsen, National Security Resources Board, says the courses are being established now, not with the thought that war is imminent, but because it takes a long time to recruit, train and organize teachers, trainers and an adequate number of actual monitors.

One of the prime aims of the courses is to develop a uniform viewpoint and get rid of the conflicting and contradictory statements about the hazards of atomic bomb radiation with which recognized experts so frequently frighten the people of the country almost into hysteria.

A product of the work of Dr. Mead's panel should be a notable stimulus to the manufacture and use of training aids, that will take many diversified forms to fit specialized educational tasks. Informed opinion is that production of such aids is on its way to being one of the country's important industries.

Seyferth New C of C Head

For the second time in succession the Chamber of Commerce of the United States has drafted its president from the metalworking industry. He is Otto A. Seyferth, president of the West Michigan Steel Foundry Co., Muskegon, Mich. He succeeds Herman W. Steinkraus, president and chairman of the board, Bridgeport Brass Co., Bridgeport, Conn.



OTTO A. SEYFERTH
. . . succeeds Steinkraus

Mr. Seyferth is the first man with a labor background to head the chamber in its 38-year history. He came up the hard way, starting out at the age of 13 as a stone carver's apprentice. He joined the Stone Carvers' Union, American Federation of Labor. Later he became president of his local and eventually headed the AFL trades and labor council in Grand Rapids, Mich.

After wondering about the white collar group, he decided to get a job as a white collar worker. He started out as a timekeeper. It wasn't long before he was promoted to production manager. His new work acquainted him with business finance. He decided to make another change and went to work at the bottom again—for Bonbright & Co., New York. Learning something about business reorganization, he went out on his own and was soon helping put ailing businesses back on their feet.

He worked eight years as a business physician—and he's still at it. Because he was always sold on organization, he joined the local chamber of commerce wherever he went.

About All There Is To Know

How much technological information is being withheld from industry and the public by the Atomic Energy Commission? Comparatively little—at least in one important reservoir of subject matter that it was studying, says a working party of business paper editors comprising Keith Henney, *Nucleonics and Electronics;* S. A. Tucker, *American Society of Mechanical Engineers Journal;* F. J. Van Antwerpen, *Chemical Engineering Progress;* Sidney Kirkpatrick, *Chemical Engineering;* and E. E. Thum, *Metal Progress.*

The group made an investigation of the abstract file maintained by the AEC Patent Branch. After exploration in certain subject breakdowns, the group thought there was "no great store of unclassified or clearly declassifiable technological information that has not been declassified and which would be of great usefulness to American industry." The members thought no further study of this kind is warranted. The editors believe "the complete technology of a major atomic energy process, such as that

being carried on at Y-12 (the magnetic process installation at Oak Ridge, Tenn., for the separation of isotopes)" should now be studied.

Nails Really Hold House Together

The use of annular grooved steel nails increases the resistance of frame houses to high winds and other strains like those caused by settling of the foundations, says the Housing and Home Finance Agency. The finding is based on tests conducted for HHFA in the Wood Research Laboratory, Virginia Polytechnic Institute.

Seven more housing research programs are to be launched for HHFA by the National Bureau of Standards, the United States Weather Bureau and the University of Toledo: 1. Strength of light-gage tubular metal columns for supports in dwellings; 2. designs of roofs for snow loads in different sections of the country; 3. serviceability of flashing materials in dwelling construction; 4. effectiveness of paint vapor barriers after cleansing and washing with various types of cleaning agents; 5. effectiveness of methods of construction to prevent termite attack; 6. efficiency of soil cover materials as vapor barriers under basementless houses; 7. evaluation of concrete blocks when cured under four methods commonly used.

Safety Goal Can Be Achieved

Last year at the President's Conference on Industrial Safety the administration called for a 50 per cent reduction in industrial accidents by 1952. The Bureau of Labor Statistics thinks the goal may be achieved; BLS finds that accidents in the manufacturing industries were down 19 per cent in 1949 compared with 1948.

More RFC Metalworking Loans

Larger loans by Reconstruction Finance Corp. during March—involving $500,000 or more—included these of interest to the metals industries:

Connecticut Telephone & Electric Corp., Meriden, Conn., manufacturer of telephone and signaling equipment, $500,000, for five years, for working capital and debt payment.

Gemco Engineering & Mfg. Co. Inc., Cincinnati, fabricator of steel and aluminum products, builder of road equipment and metal grain storage bins, $2,008,000, for two months, for machinery and working capital.

Fox Metal Products Corp., Fort Logan, Colo., sheet metal contracting and fabrication, including manufacture of prefabricated houses, $568,000, for four months, for working capital.

National Steel and Shipbuilding Corp., San Diego, Calif., steel fabricator and shipbuilder, $1,250,000, for seven years, for working capital and debt payment.

East Tennessee Natural Gas Co., Chattanooga, Tenn., $3.2 million, for four months, for construction of natural gas pipelines and purchase of pipeline equipment.

Glenn L. Martin Co., Baltimore, airplane manufacturer, $13 million, for two years, for purchase of machinery and working capital.

Binkley Mfg. Co., Warrenton, Mo., manufacturer of castings, rolled steel forms, tools and dies, and stampings, $650,000, for seven years, for working capital, debt payment.

Bentonite: Clay of Many Uses

Not long ago a contractor was tearing his hair because of leaks in a dam he had built for the government. He used a carload of bentonite and reduced the leakage to an inappreciable amount. How come?

Bentonite, a colloidal clay mined in the West, has an amazing faculty of turning into jelly when mixed with water and stirred. It also will turn into a thin solution when stirred again, and back to a jelly if stirred again—back and forth any number of times.

Bentonite has also proved its worth in stopping up leaks in foundations. It is best known for its use in oil well drilling and as a binder in foundry sand. But its unusual properties are the kind, most hands agree, that suggest many uses as yet undiscovered, many still undeveloped.

The reason for the current interest in bentonite is this: The Bureau of Land Management, Interior Department, will open bids in Washington June 14 on bentonite leases on 320 acres in Weston county in Wyoming.

Mining Motto: Never Say Die

"Never say die" must be the slogan of the mining bloc in Congress.

The House Public Lands Committee reported favorably H. R. 8221, by Rep. Clair Engle (Dem., Calif.). It is another mining subsidy bill with special benefits to copper, lead and zinc marginal miners. Since it is a slightly rewritten edition of the subsidy bill that was killed in the House, its chances of being passed are slim.

Guide to German Patents Out

A new "finding" guide to wartime German patent applications—some 200,000 of them filed in the Berlin Patent Office in 1940-1945—breaks these applications into 13 major industrial groups, 89 classes and 500 subclasses—so they're easy to locate.

Copies of the guide, "Subject Outline of the Unpublished Applications for Patents Filed at the German Patent Office, 1940-1945," are available on request from the Office of Technical Services, Commerce Department, Washington 25.

Glossary of Uranium Minerals

Stemming from the current interest in atomic research and development, the government has prepared a glossary on uranium and thorium minerals, intended as a guide to nomenclature of these minerals. Issued as Geological Survey Circular 74, free copies may be had by writing the director, United States Geological Survey, Washington 25.

Researchers Want Wives Around

The Economic Cooperation Administration's effort to step up mineral exploration so U. S. stockpiles can be built up is lagging for an odd reason: American geologists, cartographers and other technicians don't want to leave their families home while they go abroad.

The Geological Survey, which is supervising the detail for ECA, wants to engage 60 qualified men to survey mineral resources in various United Kingdom dependencies in Africa, the Far East and British Guiana. So far only 11 have been attracted to far corners of the earth —and perhaps away from their wives. One of the major troubles in hiring qualified men is a British regulation that forbids married men from sending for their families until after a six months' wait.

Whys and Wherefores of Testing

To answer many inquiries from industry about the scope of its testing program, the type of tests it conducts, and the fees it charges for this service, the National Bureau of Standards prepared National Bureau of Standards Circular C483. Its title is "Testing by the National Bureau of Standards." Its 93 pages covers the ground thoroughly. You can get a copy for 25 cents from the Superintendent of Documents, Government Printing Office, Washington 25.

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Auto Industry Takes More Steel

The perennial leader among steel consumers beats its own previous record by taking 18.9 per cent of all the steel shipped from mills in 1949

THE GREAT American desire to own an automobile was strong enough in 1949 to push the automotive industry's steel consumption to a new record at a time when most other classes of consumers were finding their steel needs reduced. This is reflected in a detailed report issued by the American Iron & Steel Institute.

The auto industry's new record consisted of 10,962,894 net tons of steel, or 18.9 per cent of the 58,104,010 tons shipped from mills in 1949. In 1948 the auto industry took 10,220,982 tons, or 15.5 per cent of the 65,973,138 tons moved from mills. The decline in total shipments in 1949 compared with 1948 amounted to 11.9 per cent and resulted largely from lowered needs of some industries and a steelworkers' strike.

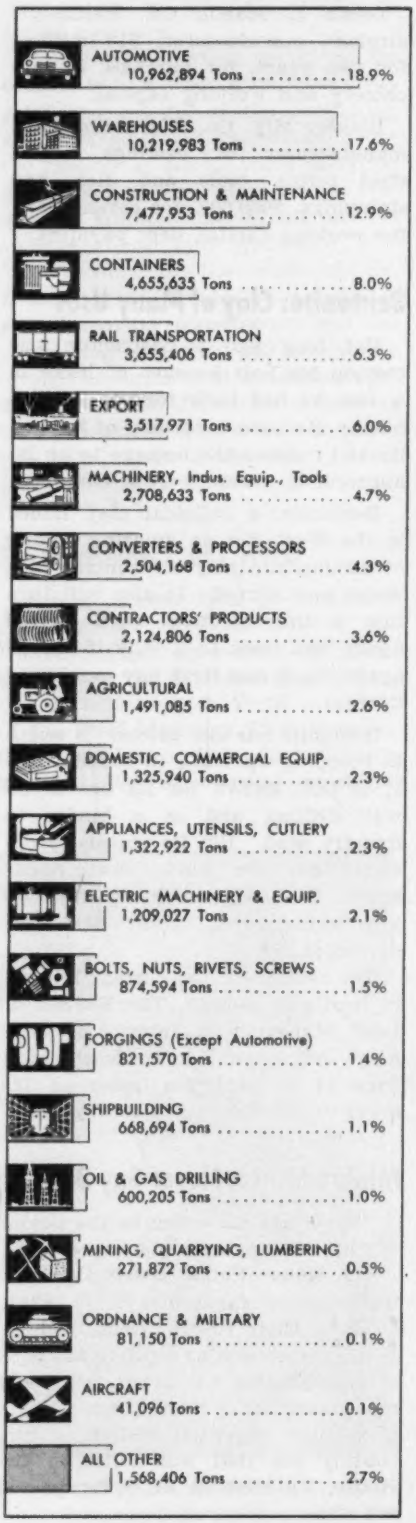
Better Than Ever—In continuing its record-breaking pace into 1950 the automotive industry's take of steel in January and February rose 20 per cent over that in the corresponding months of 1949. In January, 1950, the auto industry received 1,167,985 tons, or 21.7 per cent of the 5,482,691 tons shipped from mills, and in the following month the auto industry took 1,082,500 tons, or 21.5 per cent of all mill shipments. The auto industry's total take for the two months is 2,250,485 tons, or 21.6 per cent of all mill shipments of finished steel. In January, 1949, the auto industry received 946,368 tons, or 16.4 per cent of all mill shipments, and in February of that year it took 924,046 tons, or 16.7 per cent of all mill shipments.

The institute's 1949 final figures on total mill shipments and the automotive industry's take of finished steel show that STEEL magazine's estimates of these in its Metalworking Yearbook Issue, Jan. 2, 1950, p. 129 were correct within one-half of 1 percent. STEEL had the benefit of only 8 months' shipments as a basis for making those estimates.

Warehouses Are Second — Second largest customer of the steel mills in 1949 was warehouses. They took 10,219,983 tons, or 17.6 per cent of all mill shipments, compared with 11,405,749 tons, or 17.3 per cent in 1948. Third largest customer, but the second largest consumer, was the construction and maintenance industry. In 1949 it took 7,477,953 tons, or 12.9 per cent of all finished steel shipped from mills. How the various market classifications ranked is shown in the accompanying chart.

Who Got the Steel—

. . . all grades, 1949



Most important steel product in the auto industry's receipts in 1949 was cold-rolled sheets, the take being 4,068,035 tons. Next in importance were hot-rolled sheets, 2,448,418 tons, and hot-rolled bars, 1,861,140 tons.

One Jump Ahead — Although the automotive industry was the No. 1 buyer of all steel it was not, however, the biggest buyer of carbon steel. Warehouses led with 9,905,803 tons and automotive followed with 9,498,843 tons. In ranking as the biggest buyer of alloy and stainless steels the automotive industry took 1,410,692 tons of alloy and 53,359 tons of stainless.

Comparisons of the largest buyers of alloy steel (other than stainless) are shown in an accompanying chart. Complete figures on distribution of alloy steel (other than stainless) in 1949 follow:

Market Classification	Net Tons
Automotive	1,410,692
Machinery, Indus. Equip., Tools	373,855
Electric Machinery & Equip	315,723
Forgings, except automotive	276,379
Warehouses	262,647
Rail Transportation	124,049
Oil & Gas Drilling	112,601
Export	100,919
Unclassified	78,467
Construction, Maintenance	77,712
Converters, Processors	61,590
Contractors' Products	43,563
Bolts, Nuts, Rivets, Screws	38,869
Agricultural	37,580
Domestic, Commercial Equip.	31,299
Shipbuilding, Marine Equip.	23,832
Appliances, Utensils, Cutlery	22,906
Mining, Quarrying, Lumbering	21,312
Aircraft	20,896
Containers	15,096
Ordnance, Other Military	10,829
Total	3,460,816

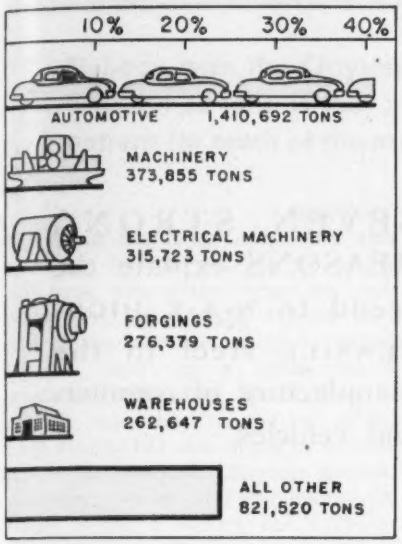
The Leader—Hot-rolled bars were the most important product tonnagewise in mill shipments of alloy steel. They accounted for 1,449,906 tons. Largest single taker of hot-rolled alloy bars was the automotive industry, its receipts being 979,123 tons.

In ranking first as a buyer of stainless steel the automotive industry took 53,359 tons, or 19.9 per cent of all mill shipments of that product (see accompanying chart). Most important stainless product tonnagewise was cold-rolled strip. It accounted for 105,072 tons out of 267,677 tons of stainless shipped by mills and for 50,875 tons of the automotive industry's receipts of stainless.

Breakdown of stainless distribu-

Best Customers

. . . of alloy steel makers in 1949

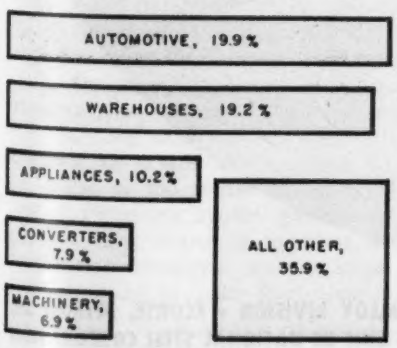


tion in 1949 by market classifications follows:

Market Classification	Net Tons
Automotive	53,359
Warehouses	51,533
Unclassified	33,205
Appliances, Utensils, Cutlery	27,289
Converters, Processors	21,079
Machinery, Indus. Equip., Tools	18,337
Export	15,040
Aircraft	9,048
Construction, Maintenance	7,067
Domestic, Commercial Equip.	5,569
Contractors' Products	4,986
Forgings, except automotive	4,906
Electric Machinery & Equip.	4,348
Rail Transportation	3,936
Containers	3,149
Bolts, Nuts, Rivets, Screws	2,317
Ordnance, Other Military	959
Shipbuilding, Marine Equip.	653
Mining, Quarrying, Lumbering	428
Agricultural	270
Oil & Gas Drilling	199
Total	267,677

The Leaders

. . . in stainless steel usage, 1949



Packing Can Boost Sales, Cut Costs

A record-breaking crowd attending American Management Association's show found the latest devices put out by packing machinery makers and package designers

THE CONTAINER was labeled "19th National Packaging Exposition" and inside were products to cut costs and stimulate sales. A record-breaking crowd of more than 19,100 attended American Management Association's show and conference in Chicago to study the latest devices of packaging machinery makers and package designers.

One demonstration and exhibit was put on by General Electric Co. GE makes 200,000 different products ranging in weight from less than two ounces to over 350,000 pounds. Its bill for packaging and packing materials is $20 million-plus a year.

Too Many Ribbons—F. G. Moloney, Manufacturing Policy Division, Schenectady, N. Y., says: "No packing cost is justified that does more than protect our products under normal shipping hazards." Exception is made on special-built products of high value where over-caution is practiced.

Mechanical equipment to package products which are mass-produced should be carefully considered. This is an area, Mr. Moloney asserts, "where much remains to be done and which presents a tremendous potential for cost reduction."

Two-Way Street—A packaging problem at the shipper's end may create a materials handling problem at the receiver's end, he relates. Incoming packaging may be costing entirely too much. Variations in packaging of components from various suppliers may add to handling and inventory costs. "Evaluation of the packaging of vendors' supplies opens up a vast area of cost reduction," he states.

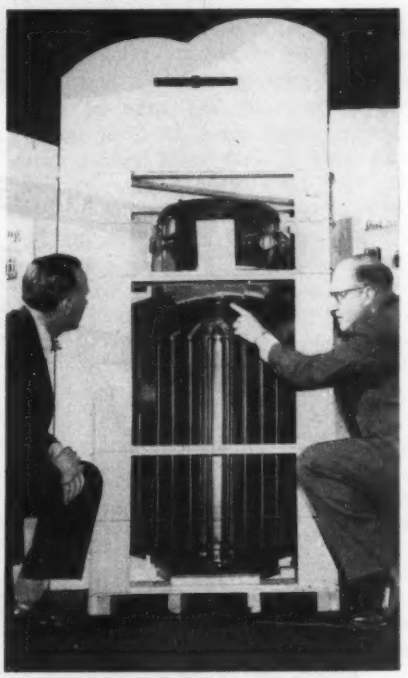
G. F. Simmons, Central Purchasing Division, Schenectady, cites a study under way on an item which now is received, boxed, from a supplier. GE reships this item inside a finished refrigerator. Because the item gets little handling it might need only wrap-around protection or possibly only the protection of a paper bag. GE's possible savings on this one item would run over $75,000 a year.

Packaged Profit—H. J. Benzie, production manager, Appliance & Merchandising Division, Bridgeport, Conn., gives these case histories of packaging problems and solutions:

The box used for individual toasters was redesigned, inner packing pieces simplified, less paper used. The material cost was reduced 39 per cent, the new box costing 9½ cents, versus 15½ for the old.

GE refrigerators are being shipped in completely corrugated boxes. The all-corrugated box reduces shipping damage, is easier to uncrate, costs less, requires less storage space.

Packaging material costs were eliminated completely in the case of dishwasher tubs. When these were packed in individual corrugated boxes, the company suffered damage to porcelain enamel. No longer boxed, the tubs are transported in GE-designed racks which are now



GE-PACKAGED TRANSFORMER
. . . packaging engineer shows how

part of the railroad car equipment.

Package for GE 100 kva transformers formerly was a nailed wooden box. The new container (see cut) is a wirebound skeleton with a base for fork lift-truck use. Savings of 10 per cent in materials and 4 per cent in freight is realized.

Purchasing Men To Hold Show

The Milwaukee Association of Purchasing Agents is again sponsoring a "Products of Industry Exhibit." It will be held at the Milwaukee Auditorium Oct. 17-19, 1950. Its theme is: 1950 Parade of Products. It is the sixth such exhibit sponsored by the group.

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MAKE A TON OF SHEET STEEL GO FARTHER

Specify—

N·A·X

HIGH-TENSILE STEEL

SEVEN STRONG REASONS explain the trend to N-A-X HIGH-TENSILE steel in the manufacture of commercial vehicles.

- NAX FINER GRAIN STRUCTURE
- NAX GREAT IMPACT TOUGHNESS
- NAX HIGH STRENGTH
- NAX HIGH FATIGUE RESISTANCE
- NAX GOOD FORMABILITY
- NAX EXCELLENT WELDABILITY
- NAX HIGH CORROSION RESISTANCE

GREAT LAKES STEEL CORPORATION N-A-X ALLOY DIVISION • ECORSE, DETROIT 29, MICH. • UNIT OF NATIONAL STEEL CORPORATION

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Nobody won the Chrysler strike. One reason why Chrysler held out so long is that it knows its agreement will set the pattern for much of the parts industry not yet signed

DETROIT

WITH all the chips down, it's now or never for Chrysler as its plants roll back into action after an estimated loss of perhaps 475,000 cars and trucks worth close to $1 billion as the result of a strike which stretched from Jan. 25 to May 5. Nobody won the dragged-out affair, as is always the case in major strikes. As H. L. Weckler, Chrysler general manager, wrote his employees—"A strike is not a victory for anybody. We point these things out as a matter of experience and perhaps guidance in future relations."

Fourteen Points—By "these things" he meant 14 principal provisions of the new contract signed with the UAW-CIO, to wit:

1. Pensions of $100 monthly, including social security, for employees at age 65 with 25 years of credited service.

2. Proportionate pensions for employees at age 65 with ten or more years of credited service.

3. Lesser pension payments for employees with 25 years of credited service who are 60-64 years of age and who retire before 65 with company consent.

4. Employees not desiring to retire at 65 may work to 68 if they choose and are able, and after 68 with company consent.

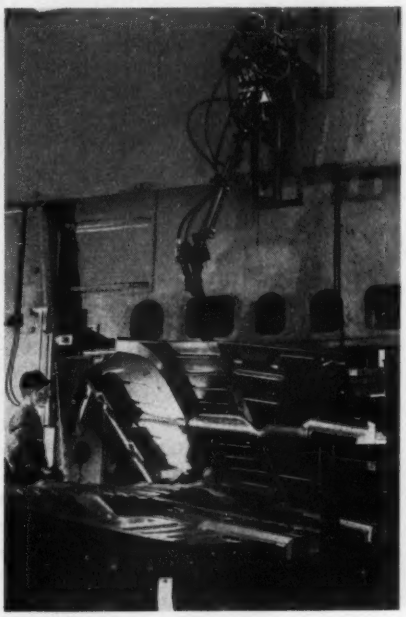
5. A 20-month adjustment period during which no employee will be required to go into retirement because of his age.

6. Past service credited to employees on the basis of seniority plus all years worked with the company prior to seniority unless interrupted for more than two years at one time.

7. Future service credited up to age 68 on the basis of a full year for any year in which 1700 or more hours are worked and with less than 1700 hours of work on one year to be credited proportionately.

8. Pensions for retiring employees to be funded on the basis of a level funding plan similar to the Ford Motor Co. plan with full benefit to the corporation of any increase that may be made in the future in social security payments by the government.

9. A joint board of company and union representatives with an impartial chairman to make final decisions under the contract as to the eligibility of employees to receive benefits and to handle other matters of this sort.



AUTOMATION: Automatic feeding and ejection is the rule rather than the exception at the Fisher Body stamping plant, Hamilton, O. A mechanical hand pulls a floor pan from a press, thus eliminating the job of reaching under the die to pull out heavy, cumbersome panels. Automation—machines taking the place of human hands in performing heavy, awkward and hazardous tasks—has been developed to a high degree of efficiency in the automobile body-building division of General Motors

10. Life insurance of $3600 for hourly-rated employees, including protection against total and permanent disability, can be carried with small payments by these employees and the company paying the balance.

11. Employees retiring after 65 with 15 years or more of service will have free life insurance of from $500 to $1000, depending upon length of service.

12. Provision for sickness and accident insurance that pays $8 weekly for up to 26 weeks at low cost to each employee and with the company paying the balance—accident payments to start on the first day after the accident, and sickness payments to start on the fourth day after the sickness.

13. The company will pay $1.50 per month toward the cost of group hospital, surgical and in-hospital medical expense benefits for each of its employees—the employee to pay the remainder and any additional for extra coverage he may wish to carry for himself or for his family.

14. Miscellaneous matters, including improvements in bargaining procedure and provision for the voluntary check-off (not the union shop). Wage increases ranging from 2 to 20 cents an hour were granted in 45 job classifications. In actual form, the pension and insurance provisions are part of the overall collective bargaining contract, with the pension provisions to run for a period of five years. The contract is to run for three years with the right of each party to open the question of the general level of wage rates and insurance once after July 1, 1951, and once after July 1, 1952.

Pension Pattern—It may be well for all companies not yet covered by new pension agreements with unions to study these points carefully. They are going to set the pattern for a large section of the automobile parts industry, both in Detroit and elsewhere. Chrysler negotiators knew this and that is one reason why there was so much delay in arriving at a final agreement. There were actually hour-long battles over just where to insert a comma in the wording of the agreement.

Obviously the UAW-CIO had to do a concerted selling job to its Chrysler membership to prove that the long tieup had been worthwhile. An eight-page printed brochure was sent to the employees involved in which the effort was made to blare the outlines of a great victory and to point out how much better the Chrysler contract was than the Ford or Nash agreements. To the dispassionate observer the words had a hollow ring and revealed no victory that could not have been won without a strike.

Cool Relations—There is still no love being lost between Chrysler and the UAW-CIO, despite the contract agreement. Time may change that. In any event, the long-idled thousands began streaming back to company plants last Monday and first reports showed surprisingly little absenteeism. Those who had left town were being given five days in which to return or else be removed from the employment rolls. Meanwhile

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several thousand new employees were being recruited as an all-out effort started to shove production to the limit. An early check disclosed 4000 cars and trucks coming from assembly lines on the first day of resumption, a remarkable achievement in the opinion of many. It was possible by virtue of the fact that feeder lines and subassemblies were all ready to move at a moment's notice, and there were no "pipelines" to be filled.

It will be well to keep a close tab on auto assemblies now that Chrysler is back in the picture. By all odds, other producers who have been rolling along in the stratosphere—General Motors and Ford—should be in for a recession in retail demand. With Chrysler shooting for 42,000 weekly, the industry's total assemblies could reach 190,000, far beyond anything ever approached. No one believes a pace like that can be held for any appreciable length of time.

Briggs Absenteeism High

Briggs Mfg. Co., a principal Chrysler body source, disclosed absenteeism among employees was around 16 per cent on the first day of renewed operations.

It has been reorienting facilities to handle sharply higher body output, particularly for Plymouth. Some space in the Briggs Conner plant, once devoted entirely to Packard, has been set aside for Plymouth coupe production. Additional plant space, amounting to about 18,000 sq ft, has been leased on Eight-Mile road at Doepfer, a building formerly occupied by Sav-Way Industries and now owned by Vogue Recordings Inc. About a year ago Briggs leased 50,000 sq ft of space adjoining the recent acquisition and had centered certain small parts fabrication and subassembly operations there. The new area will be given over to trim operations on Chrysler 7-passenger sedans.

Navy Buys Underwater Jeeps

First shipments of 1000 underwater jeeps for use by the Navy's Bureau of Ships are being made by Willys-Overland on a contract which, with radios and parts, amounts to more than $3 million. The underwater jobs have the same outward appearance as civilian jeeps, principal differences being in engineering features. They are equipped with deep water fording equipment enabling them to operate completely submerged.

Before delivery, a sampling of each day's production is given a rigorous underwater test in which the jeep operates for 15 minutes submerged in a tank at the Toledo plant.

O, Henry!

Three entrants who submitted an appellation that struck no high note of originality got prizes of $10,000, $5000 and $2000 for naming the new low-priced Kaiser, the "Henry J." The selection came from among several hundred thousand submitted.

Concurrently with the announcement, 12 models of the 1951 Kaiser were introduced publicly last week. They carry price tags lower by as much as $96 than their 1950 counterparts.

Hang on to Walnut Shells

If you have an accumulation of walnut shells or apricot pits, don't throw them away. The automotive industry is using quantities of them as abrasive material for deburring cast aluminum elements of torque converters in automatic transmissions. Once a tedious hand operation with portable tools, it is now being done on American Wheelabrator equipment. Buick has two units on the work, and Packard has installed one. Packard processes six cast aluminum parts of the transmission, ranging from 13½ down to 5 inches in diameter, positioning them on five 17-inch diameter small tables which rotate on a main table carrying the parts under the abrasive stream which is fed from a wheel turning at 2250 rpm, giving a velocity of 230 fps.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	610,211	445,092
February	504,954	443,734
March	609,463	543,711
April	582,000*	569,728
May		508,101
June		623,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
April 22	151,613	141,227
April 29	148,274	136,728
May 6	146,583	130,113
May 13	155,000	119,634

Estimates by Ward's Automotive Reports

* Preliminary.

The idea of using walnut shells and apricot pits developed from efforts to get a "softer" abrasive than the conventional steel or cast iron shot. The shells and pits are ground to three different sizes, those being used currently being 12-20 mesh and 20-40 mesh. Cost of the material is $170 per ton and it is obtainable from either C. P. Hall Co., Chicago, representative of Agacide Laboratories of California, or Composite Materials Co., New York.

The wheel-blast machines are of conventional type with a few modifications such as provision for more storage space for the abrasive. At first it was feared there would be considerable breakdown of the abrasive, but tests showed it to be far less than expected. Consumption at Packard is roughly 5 lbs per hour and 320 sets of the six castings are being handled every 10 hours. One abrasive machine replaces about 15 workers using deburring tools.

Tire Prices May Rise

Harry E. Humphreys Jr., affable and loquacious new president of United States Rubber Co., "met the press" here last week after making an address before the Detroit Economic Club. He disclosed some weird goings-on in the natural rubber market, where prices have leaped from 18½ cents a pound on Jan. 27 to a recent high of 26 cents. The situation has all tire manufacturers (52 per cent of U. S. Rubber's output is tires) in a dither and they cannot see anything but at least a 5 per cent price increase within the next month.

Unexpected strength of car and truck production this year and the continued high level of replacement demand fooled the rubber company market analysts and forced manufacturers to scramble into the market for more natural rubber tonnage. British and Dutch interests, controlling the bulk of supply, promptly saw the opportunity to step up their dollar balances and hiked the price.

Two-thirds of all rubber used in transportation items today is natural rubber, the rest synthetic, artificially priced at 18½ cents a pound. Four years ago, use of synthetic accounted for 71 per cent of the total. Mr. Humphreys, associated with U. S. Rubber for 12 years during which time he had only one promotion—from vice president to president—thinks rubber consumption this year will run to 650,000 tons natural and 420,000 tons synthetic, and if there were more synthetic available it would be snapped up. He estimates that every time natural rubber moves up 1 cent it adds about $1 million monthly to industry's costs.

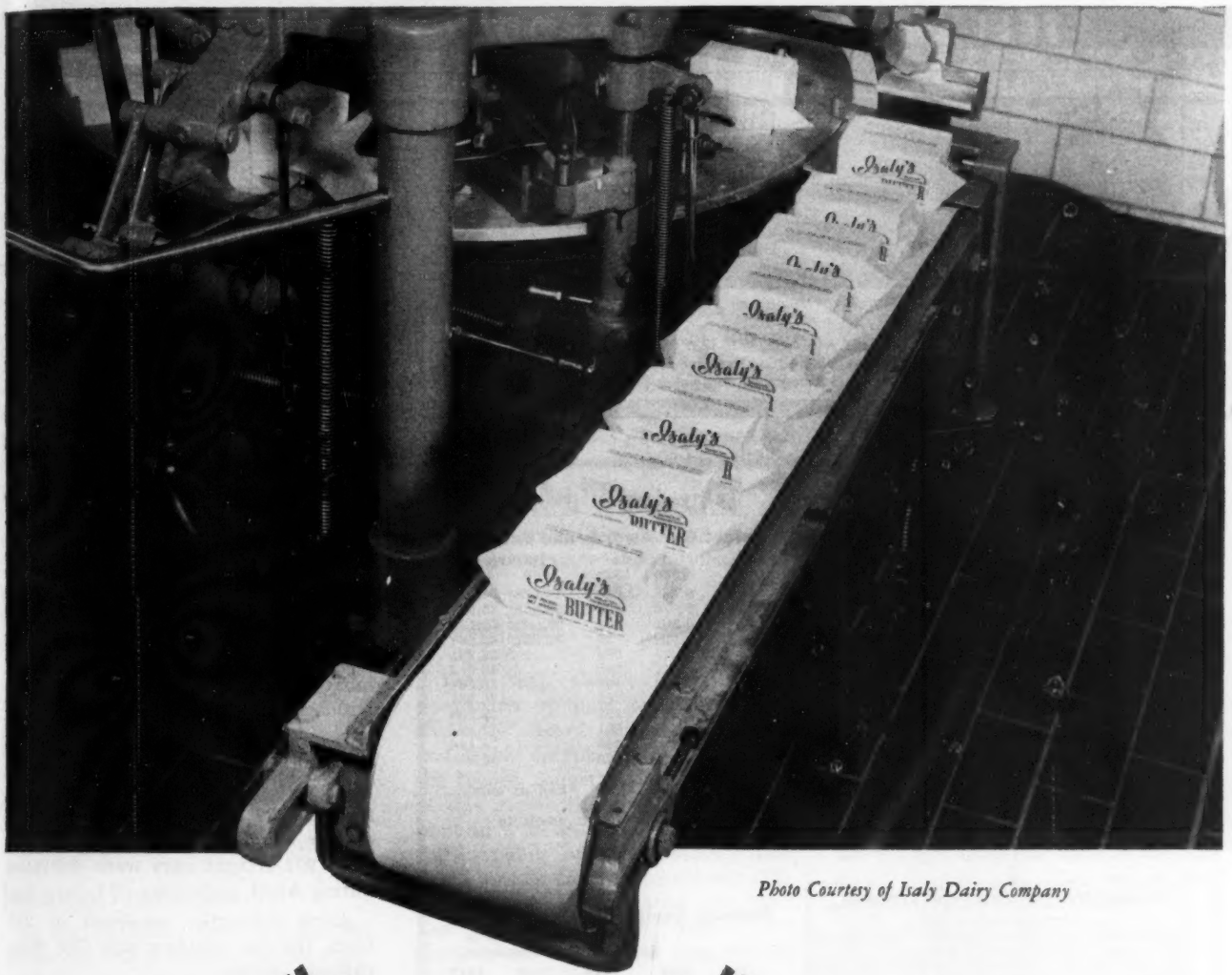

Photo Courtesy of Isaly Dairy Company

Republic "*Butter Belts*" are better built

Fresh creamery butter . . . more than twelve tons of it! That's the daily diet for the handsome white Republic Reprene Conveyor Belt shown above.

The belt moves the butter with military preciseness from the "printing" machine that measures, shapes and wraps the familiar one-pound loaves, and although it's a nice clean job, it's full of problems for ordinary conveyor belts.

Sanitation requirements are rigid. Every day, the belt undergoes a thorough drenching in boiling hot water. And, since butter is a milk product, it is high in acid content and highly flavored with salt.

These deteriorating factors . . . factors that once reduced an ordinary conveyor belt into a gummy mass in less than one month . . . haven't harmed Republic's white Reprene Canner's Belt. *It has already given better than eighteen times more service and still rolls on!* Its smooth, sanitary Reprene cover continues to repel the corrosive action of the salt and fatty acids. The hot water baths have had no harmful effects, and there's no odor or taste from the belt to be imparted to the highly absorbent butter.

There's a local Republic Distributor near your plant who can furnish better-built industrial rubber items, properly designed to give increased service life on the toughest job you have. . . . Contact him today or write direct for particulars. Whether it's hose, transmission or conveyor belting, packing or any product of industrial rubber, your best buy is Republic . . . *the* specialist in the industrial rubber goods field for nearly fifty years.

Pioneers in the use of COLD RUBBER

REPUBLIC RUBBER DIVISION
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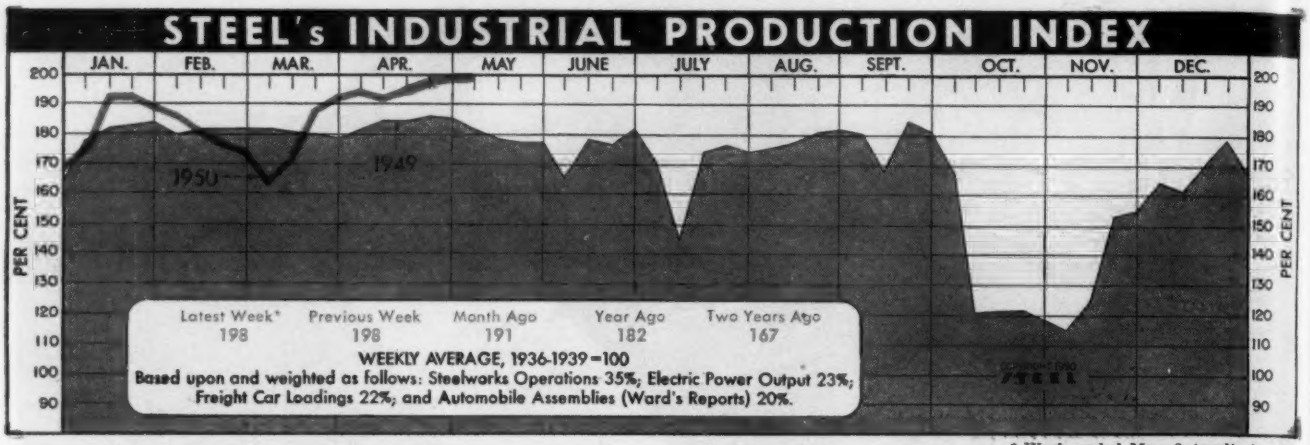
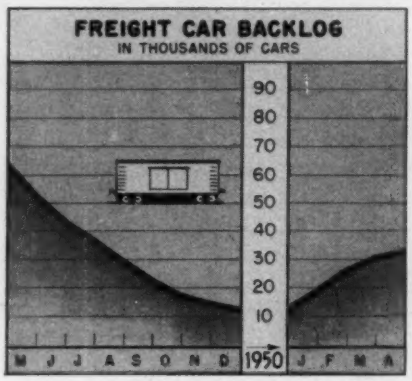

STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1950
1949
Latest Week* 198
Previous Week 198
Month Ago 191
Year Ago 182
Two Years Ago 167
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.

* Week ended May 6 (preliminary)

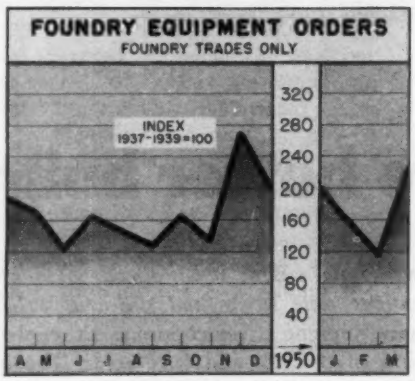


Charts—Copyright 1950, STEEL

Freight Car Awards and Backlogs

	Awards		Backlogs*	
	1950	1949	1950	1949
Jan.	9,385	1,663	19,026	96,214
Feb.	9,075	332	26,055	85,974
Mar.	6,201	199	30,539	73,188
Apr.	3,308	30	32,857	62,569
May	....	589	.....	52,281
June	....	153	.....	42,813
July	....	408	.....	36,564
Aug.	....	185	.....	28,731
Sept.	....	123	.....	22,203
Oct.	....	201	.....	17,377
Nov.	....	1,145	.....	14,146
Dec.	....	1,220	.....	12,036
Total	....	6,248	*End of month.	

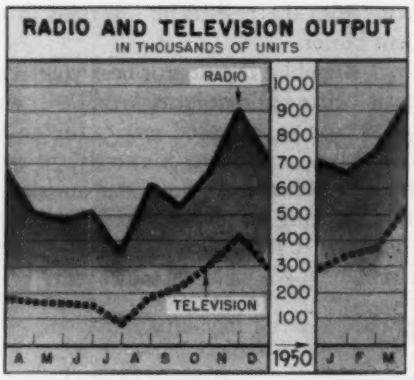
American Railway Car Institute



Foundry Equipment Orders

	Index		Value in Thousands	
	1950	1949	1950	1949
Jan.	159.3	149.9	$731	$694
Feb.	113.1	144.4	519	668
Mar.	225.2	190.8	1,034	883
Apr.	....	172.0	....	797
May	....	121.9	....	565
June	....	164.9	....	764
July	....	146.6	....	679
Aug.	....	127.1	....	589
Sept.	....	166.6	....	772
Oct.	....	133.5	....	618
Nov.	....	270.4	....	1,250
Dec.	....	201.0	....	929

Foundry Equipment Mfrs. Assoc.



Radio and Television Output

Thousands of Units

	Radio		Television	
	1950	1949	1950	1949
Jan.	660	710	336	121
Feb.	750	598	367	119
Mar.	980	679	525	182
Apr.	...	506	...	167
May	...	478	...	163
June	...	512	...	161
July	...	342	...	80
Aug.	...	623	...	186
Sept.	...	532	...	225
Oct.	...	670	...	305
Nov.	...	910	...	414
Dec.	...	707	...	292
Total	...	7,247	...	2,414

Radio Manufacturers Assoc.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Constr. Valuation ..Apr.17	Gray Iron Cast. ...Apr.24	Ranges, Gas Jan.2
Employ., Steel Apr.17	Indus. Prod. May8	Refrigerators May1
Durable Goods Apr.24	Machine Tools Apr.24	Steel Castings Apr.24
Employ., Metalwkg.Apr.24	Malleable Cast. ...May1	Steel Shipments ..Apr.24
Fab. Struc. Steel..May8	Price Indexes May1	Trucks, Elec. Ind...Jan.2
Forgings, Steel ...Apr.31	Pumps, Orders May1	Vacuum Cleaners...May1
Furnaces W. Air...May8	Purchasing Power...May8	Wages, Metalwkg...Mar.20
Gear Sales May8	Ranges, Elec. May1	

Freight Car Orders Slip

Freight car orders declined for the fourth consecutive month and totaled 3308 in April. All the cars were placed with car builders, showing the effect of the freight car lease programs. January was the only other month this year when awards to car builders exceeded those to railroad shops.

Despite this decline in car ordering the backlog on May 1 rose to 32,857 from 30,539 a month earlier because of low shipments during the month. Only 971 freight cars were delivered during April.

April deliveries consisted of 223 from the car builders and 748 from railroad shops.

Radio, TV Buying Spree

Although both radio and television set production were high in March, television made the largest gain percentagewise. The first quarter set a new high in television receiver production, surpassing the previous quarterly record established in the fourth quarter of 1949 by 21 per cent. Receiver output in the latest period was more than three times as large as in the first quarter 1949.

Set manufacturers reporting to Radio Manufacturers Association produced 1,227,930 television receivers in the quarter ended Mar. 31, compared with 1,011,057 in the fourth quarter and 422,537 in the first quarter 1949. In March their outturn was 525,277 sets for a new record.

Radio set output gave no indication that it was running out of steam in the first quarter. Companies reporting to RMA produced 1,724,660 home and portable radios, including 273,732 FM and FM-AM sets. Automobile radios numbered 666,292 in the same period. March was the best month in the first quarter with output reaching 724,691 home sets and 255,673 automobile sets.

The Business Trend

Business has a big stake in current congressional maneuvers. Excise tax cuts may boost sales volume in some metalworking lines

CONGRESSIONAL action on pending excise tax cuts may bring in more business if your company is one of the lucky ones whose products will be taxed less severely. Washington cynics say cuts will come to industries with the most effective pressure groups.

Large corporations may find themselves clipped with a higher tax if some lawmakers have their way. Excess profits taxes also have been suggested. The last two taxes mentioned are not too likely right now but it won't hurt to keep your eyes open.

Increased defense spending is in the bag. There should be a fair amount of business accruing to aircraft firms and those making aircraft engines and parts. Other expenditures will be added to increase metalworking's defense business volume.

Industrial Production . . .

In the meantime STEEL's industrial production index keeps climbing higher and higher. In the week ended May 6 the index matched the revised figure for the week before at a preliminary 198 per cent of the 1936-1939 average. With the entire automobile industry back in production the alltime high posted in those weeks has a short life expectancy. The expectation that industrial output will move to higher ground depends on strike-free operations.

Automobiles . . .

This week should find Chrysler production in high gear and a new assembly record for passenger car and truck output being written into the record. Sometime around the end of this month the 3 millionth vehicle built in a U. S. plant is expected to come rolling off an assembly line. Truck production will be around 123,000 units in U. S. plants, the third best monthly total in history. All these factors show that May will be a good month for the industry. Beyond May the picture is cloudy. A General Motors strike is possible if the autoworkers' union sticks to its contract demands.

Steelmaking . . .

Steelmaking operations last week chalked up another high output mark. It was the fourth consecutive week in which steel for ingots and castings was poured at or slightly above practical capacity. A new record for steel tonnage produced appears to be a strong possibility this month.

Truckloadings . . .

American Trucking Associations reports the volume of freight transported by motor carriers in March increased 16.9 per cent over February and 21 per cent over March, 1949. Carriers reporting to the association transported 3,491,269 tons in March, compared with 2,986,264 tons a month earlier and 2,884,307 tons in the like month a year ago. Carriers of iron and steel hauled about 3 per cent of total tonnage. Their traffic volume increased 19.1 per cent over Febru-

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	100.5	100.5	97.5	97.0
	Electric Power Distributed (million kilowatt hours)	5,872	5,902	5,898	5,284
	Bituminous Coal Production (daily av.—1000 tons)	1,880	1,856	1,968	1,955
	Petroleum Production (daily av.—1000 bbl)	5,058	5,015	4,998	4,953
	Construction Volume (ENR—Unit $1,000,000)	$250.6	$219.1	$304.4	$129.3
	Automobile and Truck Output (Ward's—number units)	146,583	148,274	133,172	130,113
	*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	750	†745	700	768
	Business Failures (Dun & Bradstreet, number)	199	186	203	193
	Money in Circulation (in millions of dollars)‡	$27,051	$26,967	$27,133	$27,447
	Department Store Sales (changes from like wk. a yr. ago)‡	−1%	+5%	none	−4%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,578	$13,441	$14,324	$13,909
	Federal Gross Debt (billions)	$255.7	$255.6	$255.1	$251.6
	Bond Volume, NYSE (millions)	$18.8	$19.4	$20.3	$14.1
	Stocks Sales, NYSE (thousands of shares)	11,613	11,433	8,110	4,693
	Loans and Investments (billions)†	$66.5	$66.7	$66.6	$61.3
	United States Gov't. Obligations Held (millions)†	$35,931	$36,177	$36,118	$32,951
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	152.90
	STEEL's Nonferrous Metal Composite‡	165.7	163.6	157.8	188.1
	All Commodities†	154.3	153.7	152.0	155.3
	Metals and Metal Products†	170.5	170.3	169.6	168.9
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

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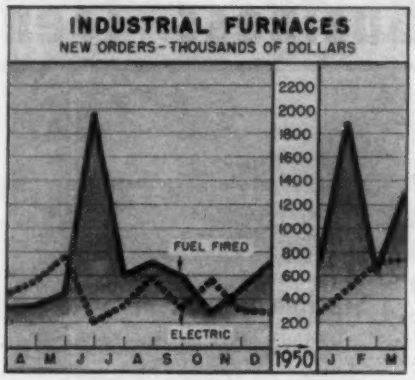
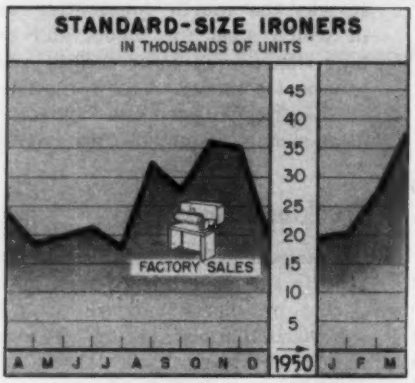


Industrial Furnaces

New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1950	1949	1950	1949
Jan.	1,914	1,047	473	948
Feb.	616	636	697	402
Mar.	1,299	305	753	436
Apr.	....	322	...	543
May	....	438	...	762
June	....	1,978	...	196
July	....	594	...	329
Aug.	....	706	...	589
Sept.	....	589	...	318
Oct.	....	269	...	565
Nov.	....	464	...	293
Dec.	....	718	...	281

* Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.

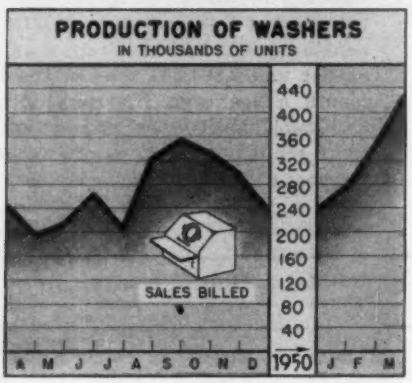


Standard-Size Ironers

Factory Sales—Units

	1950	1949	1948
Jan.	20,300	28,300	40,192
Feb.	27,600	28,400	51,651
Mar.	37,800	23,800	53,686
Apr.	.....	18,100	47,319
May	.....	19,500	44,954
June	.....	21,100	32,767
July	.....	17,700	26,679
Aug.	.....	32,300	35,203
Sept.	.....	27,700	37,308
Oct.	.....	36,045	38,517
Nov.	.....	35,000	42,000
Dec.	.....	19,400	26,000
Totals	..	307,345	476,860

American Washer & Ironer Mfrs. Assoc.



Household Washers

Sales Billed—Units

	1950	1949	1948
Jan.	275,576	172,400	360,445
Feb.	342,967	201,300	367,909
Mar.	423,802	242,500	408,512
Apr.	.....	192,500	402,257
May	.....	211,700	377,895
June	.....	260,700	392,496
July	.....	200,900	326,181
Aug.	.....	323,789	362,169
Sept.	.....	357,281	433,919
Oct.	.....	333,728	382,400
Nov.	.....	298,717	319,300
Dec.	.....	237,591	183,700
Totals	.....	3,033,106	4,317,183

American Washer & Ironer Mfrs. Assoc.

Charts—Copyright 1950, STEEL

ary and 8.1 per cent over March, 1949.

Railroads . . .

Class I railroads had a $53 million net income in the first quarter as compared with $62 million in like quarter last year. Association of American Railroads says the entire drop in net income is attributed to the eastern railroads since the western and southern roads both reported gains. The 60 Class I railroads in the East earned only $9 million in the first quarter. A year ago they earned $34 million.

Prices . . .

Wholesale prices continue their slow advance. The Bureau of Labor Statistics' price index rose 0.4 per cent in the week ended May 2 to 154.3 per cent of the 1926 average. Scrap prices are moving up, so are nonferrous metals, rubber and foods. STEEL's nonferrous price index made its fifth consecutive weekly advance in the week ended May 6 to 165.7 per cent of the 1936-1939 average, highest point since mid-November.

Construction . . .

For the fourth month in a row, heavy engineering construction volume set a new awards record. April's total was $885 million bringing the awards for the first four months of this year to $3.5 billion, a 41 per cent gain over last year. April's volume was 7 per cent over March and 41 per cent above April, 1949. Industrial building contracts in April totaled $76 million, up 19 per cent over same month last year.

Tool Sales May Be Up 20%

Optimistic estimate by Bureau of Labor Statistics is based on orders in first few months

MACHINE TOOL output this year may be up 20 per cent over 1949, says the Bureau of Labor Statistics. The industry's employment is expected to rise because of this improvement.

Basis for the bureau's optimistic estimate is early year buying which caused the BLS index for the industry to rise to its highest level in nearly four years. Employment also turned slightly upward for the first January-February gain since 1946.

Overdue Improvement—The bureau says this revival comes after a period of decline in evidence since 1942. In that year the machine tool industry had 125,000 production workers. Surplus wartime tools subsequently depressed the market and caused a slump. Employment fell to 36,000 in the early months of this year and approximated the 1939 level.

Not all segments of the industry are sharing the improved business, the bureau says. Bulk of new orders have been for special purpose machinery and attachments so that some firms are not sharing as yet in the improved business volume. The employment picture is best in Illinois, Rhode Island and New York but is still gloomy in Wisconsin.

Caution Still Exercised — Decision to use overtime rather than hire additional workers has kept down increases in the work force. Average weekly hours in March totaled 40.8 hours, indicating that considerable overtime was scheduled. Hourly earnings averaged $1.54 in February, an alltime high for the industry.

Just Below Washer Record

Standard-size washer factory sales attained the second best mark on record in March as they topped the 400,000-unit mark for the second time in history. Sales during the month totaled 423,802 units or within 2.3 per cent of the alltime high posted in September, 1948, reports the American Home Laundry Manufacturers' Association.

Sales in the first quarter came within 0.7 per cent of equaling sales for the same period in 1948. This year's total was 1,042,345 units, compared with 1,116,772 in 1948 which was the best year on record for the industry. The opening quarter total for 1949 was topped by 66 per cent.

Dryer sales also climbed sharply

to 27,125 units in March from 19,389 in February. The latest figure was 39.9 per cent higher than in the preceding month and 221.8 per cent greater than in the like month a year ago.

Ironer sales totaled 37,800 units, a 36.3 per cent increase over February's sales and 59 per cent over March, 1949. First quarter sales aggregated 85,700 and were 7.1 per cent higher than in the like period a year ago.

Second Quarter Looks Good

Good business in the automobile original equipment field but lower shipments of replacement parts when compared with the first quarter a year ago are reported by Cleveland Graphite Bronze Co., Cleveland. Shipments to other industries are in substantial volume and the second quarter should be a good one, say the company's Chairman Ben F. Hopkins and President James L. Myers. Reason given for the drop in replacement business is that a year ago the replacement market was accumulating large inventories.

Company's sales and profits for the first quarter 1950 exceeded each of the preceding three quarters but were below the like period a year ago. Net profit for the latest period was $658,721.

Better Than Year Ago

Locomotive packing and marine piston ring order booking by Hunt-Spiller Mfg. Corp., Boston, so far this year exceeds the 1949 monthly average by more than 7 per cent, says A. J. Edgar, vice president and general manager. When compared with the latter part of 1949, he continues, orders are up 48 per cent.

Orders Trend Upward

A gradual increase in orders which culminated in March's business being the best since December, 1948, and expectations that the uptrend will continue through the second quarter are reported by American Brake Shoe Co., New York. Orders in March totaled $9.1 million and shipments were at an 11-month high of $8 million.

Both the company's general equipment and railway supply divisions are expected to benefit from the improved business volume. The reason for the improvement is believed to be the reduction in customers' stocks to the point where present consumption is reflected in current orders.

Strong Financial Position

U. S. corporations increase holdings of cash and securities, decrease liabilities

CORPORATIONS in the United States are in good shape financially. The Securities & Exchange Commission estimates that at the end of 1949 their net working capital reached $67.7 billion.

Most significant development in the current position of corporations was a marked improvement in liquidity, corporate working capital at yearend being in more liquid form than at any time since early 1947. The increased liquidity resulted from a $2.6 billion rise in cash and U. S. government securities holdings and a $5.5 billion decline in current liabilities.

Ratio Improves—Corporations held more than $40 billion in cash and government securities at the end of 1949. These holdings amounted to 72 per cent of current liabilities as against 61 per cent at the end of 1948 and only 45 per cent in the years before the war.

Cash and deposits increased $900 million during 1949 to a level of $24.9 billion at yearend. Government securities holdings increased $1.7 billion so that they aggregated $15.7 billion at the end of the year. These were the only items which showed an increase in 1949. Federal income tax liabilities declined $1.7 billion and amounted to $9.7 billion at the end of last year.

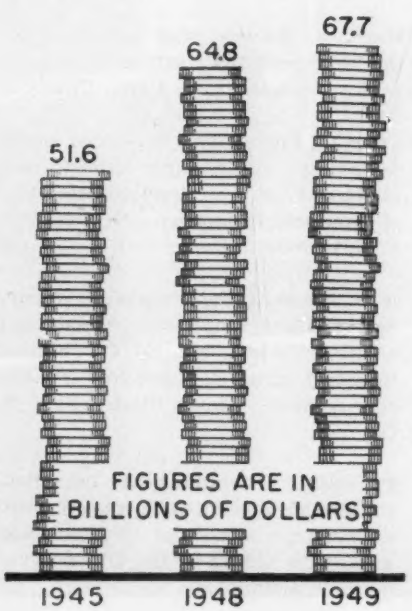
The decline in inventories amounted to $4.7 billion in 1949, bringing inventories down to $43.8 billion from $48.5 billion a year earlier. This inventory reduction was a major event during the year and was responsible for much of the recession in business activity.

Out-of-Pocket Growth — Added to the $2.9 billion rise in working capital corporations invested $16.1 billion in plant and equipment. Only $5.5 billion, or less than one-third of the $19 billion expansion, were secured from external sources. Long-term borrowings amounted to about $3.9 billion while new stock issues added $1.6 billion and were somewhat larger than in the preceding year.

Manufacturing companies accounted for over three quarters of the increase in working capital. The rest of the increase came from trade and miscellaneous financial companies. Working capital of railroad, electric and gas utilities and communications companies declined.

Improved Liquidity

. . . U. S. firms' working capital up



Helicopters Ascend

Hiller Helicopter, Palo Alto, Calif., has booked sufficient orders to place deliveries about 60 days behind the production rate. The firm in April produced and shipped nine 1950 models, representing sales of more than $195,000 in finished craft and spare parts.

Tank Contract Worth $5 Million

Bowen & McLaughlin Co., Phoenix, Ariz., has received a new $5 million contract for rebuilding the Army's General Sherman tanks. The work will involve major overhauls, including installation of new engines, and is part of the Army's tank modernization program. It is being handled by the company at its York, Pa., plant. Just completed is the rebuilding of 1300 General Sherman tanks on a previous contract.

Mountain to Mohammed

"A good way for industry and finance to get closer together," thought Aro Air Tools and Lubricating Equipment of Bryan, O., was to bring them together. It may have been like bringing the mountain to Mohammed, but Aro conducted a "one-company product exposition" in New York to bring industry and finance together.

The show opened on the main banking floor at 37 Wall St., New York. Ralph W. Morrison, vice president of Aro, told a group of financial executives and other guests: "You see, we—and a few thousand other groups exactly like us—are this country's private enterprise system. And it is a good and healthy thing for our big city cousins of Wall street to know more about us."

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Men of Industry

GEORGE P. EICHELSBACH JR.
. . . American Stove mfg. vice president

ROY D. BECK
. . . ceramic division mgr. at Binks Mfg.

GEORGE DEMOUGEOT
. . . plant manager, Sperry Products

George P. Eichelsbach Jr. was elected vice president in charge of manufacturing, **American Stove Co.**, St. Louis. Formerly director of manufacturing, he continues as general manager of the company's plants in St. Louis, Indianapolis, Cleveland and Lorain, O., and as plant manager, St. Louis factory.

Thomas M. Stinson, district sales manager, **United States Steel Products Co.**, in the St. Louis territory, was appointed general manager of sales of this U. S. Steel Corp. subsidiary, with headquarters at New York. He is succeeded at St. Louis by **G. P. Wardley Jr.**

E. W. Connolly was appointed sales manager, Detroit district, **Haynes Stellite Division,** Union Carbide & Carbon Corp., succeeding **R. D. Gunther,** retired.

L. J. Richards, chief engineer, **Dow Chemical Co.'s** Midland, Mich., division, was named director of engineering, and **E. R. McLaughlin** was promoted to head the Midland division's engineering department.

R. W. Dose was elected secretary, **Borg-Warner Corp.**, Chicago. He formerly was assistant secretary and assistant treasurer. **Mathew Keck,** formerly secretary and treasurer, was re-elected treasurer, and **Leon J. Heidgen** was named assistant secretary and assistant treasurer. **Ray P. Johnson** was appointed administrative assistant to **Roy C. Ingersoll,** newly elected president. Mr. Johnson also is a member of the board of directors of Borg-Warner, and first vice president, Morse Chain Co.

Roy D. Beck was appointed manager, ceramic division, **Binks Mfg. Co.**, Chicago. He recently was in charge of finishing in the domestic appliance division, Pressed Steel Car Co. In his new position he will work with Bink's customers and prospects, helping them obtain finer finishing in both porcelain enamel and the ceramic fields.

Ray P. Winberg was named vice president of **Revere Copper & Brass Inc.**, New York, in charge of the Rome, N. Y., division, to succeed **Forrest E. Richmond,** retired.

Philip J. Carragher has joined the sales staff of the liquid plastics division, **Ferro Enamel Corp.**, Cleveland, and will handle sales in western Ohio. **Ivan H. Shroll** was added to Ferro's Michigan sales and service staff.

Harry J. Roberts was appointed to the newly created position of factory works manager, **Cory Corp.**, Chicago.

Clair C. Finley was appointed chief draftsman, engineering department, Midland Works of **Crucible Steel Co. of America,** Pittsburgh. He succeeds **L. G. Pearce,** retired.

A. J. Edgar, general manager, **Hunt-Spiller Mfg. Corp.**, Boston, was elected a vice president. Mr. Edgar, onetime technical director, Gray Iron Founders' Society, joined Hunt-Spiller in October.

Pittsburgh Metallurgical Co. Inc., Pittsburgh, appointed **Thomas C. Ford** as district manager of the Cleveland area, with offices in the Union Commerce building.

George Demougeot was appointed plant manager, **Sperry Products Inc.**, Danbury, Conn. He was plant manager at Ronson Art Metal Works Inc., Watson-Flagg Machine Co., and Fairchild Engine & Airplane Corp.

Joseph M. Beyvl was elected a vice president, **Foundry Equipment Co.**, Cleveland. Associated with the company since 1935, he became assistant to the president in 1942. He has long been a specialist in the field of conveyor type core and mold ovens, and will continue to serve in this capacity in addition to his new duties as vice president.

Roland J. Ahern, president and general manager, Billings & Spencer Co., was elected a director of **Bingham-Herbrand Corp.**, Toledo and Fremont, O., which acquired control of the above company in 1949.

Solar Aircraft Co. appointed **Herbert K. Krumel** manager of contract administration at its Des Moines, Iowa, plant. He succeeds **C. D. Oberg,** transferred to San Diego, Calif., in charge of all aircraft product sales. **Richard W. Bourne** is in charge of the San Diego plant's commercial product sales. **Grant B. Stone** was transferred from the New York office to replace **Clark Hickerson** as manager of the Los Angeles office. The latter became assistant manager of aircraft product sales in San Diego. **Clyde W. Hull** now manages the New York office.

Baldwin Locomotive Works, Philadelphia, elected **Raymond B. Crean,** formerly assistant vice president, as vice president in charge of apparatus

Sessions TIMEKEEPERS

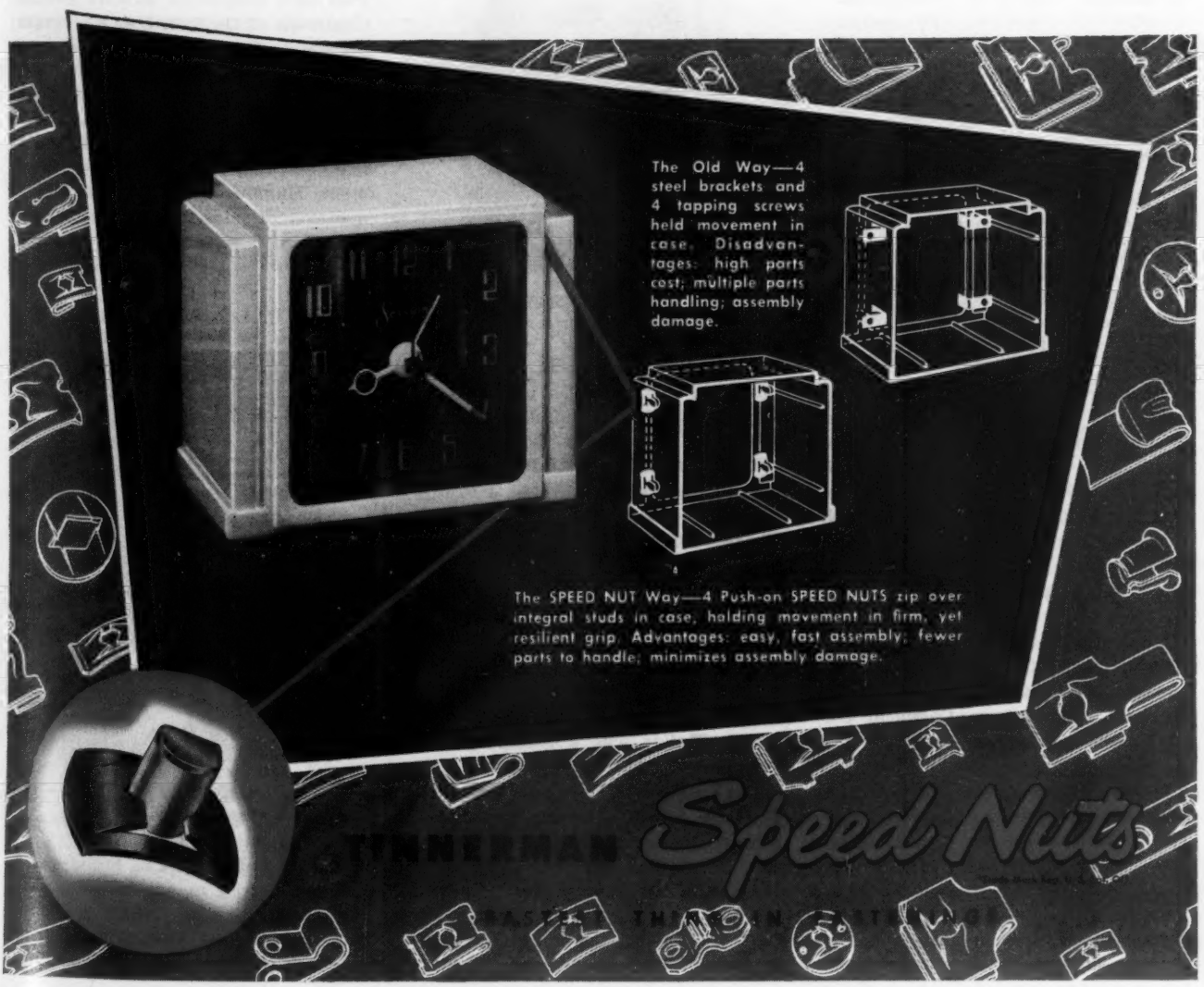
assembled at lower costs

by TINNERMAN "TIME-SAVERS"

It was a profitable decision when The Sessions Clock Company selected SPEED NUTS for an important job in the assembly of their famous "Melody" alarm clocks.

By providing a simpler, faster method of attaching the movement to the plastic case, Push-on type SPEED NUTS are saving thousands of dollars annually. This savings was reflected in lower parts cost, shorter assembly schedules, and fewer rejects.

Clocks, cars, or cap-pistols . . . whatever you manufacture, you'll find that SPEED NUT brand fasteners can provide faster, more economical ways to assemble your products. May we conduct a convincing Fastening Analysis for you? Contact your Tinnerman representative for details. And write for your copy of "Savings Stories". TINNERMAN PRODUCTS, INC., Cleveland 13, Ohio. In Canada: Dominion Fasteners Limited, Hamilton. In England: Simmonds Aerocessories, Ltd., Treforest, Wales.


The Old Way—4 steel brackets and 4 tapping screws held movement in case. Disadvantages: high parts cost; multiple parts handling; assembly damage.
The SPEED NUT Way—4 Push-on SPEED NUTS zip over integral studs in case, holding movement in firm, yet resilient grip. Advantages: easy, fast assembly; fewer parts to handle; minimizes assembly damage.
TINNERMAN
Speed Nuts

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sales, Eddystone Division. **Charles K. Olson,** general manager, Whitcomb Locomotive Co., Baldwin subsidiary, was elected assistant vice president and general manager of that company.

Thomas B. Herndon was appointed

THOMAS B. HERNDON
. . . development engineer, National Supply

development engineer, **National Supply Co.,** Pittsburgh. At present in Houston, he will, after June 1, make his headquarters at Ft. Worth, Tex.

Henry W. Beck was appointed advertising manager, **Airco Co. International,** New York.

Frank Cromwell is head of the Chicago office, **Hilfinger Corp.,** Toledo, O. He joined the company recently after serving for five years as president, Cromwell-Neukom, 20 years in the sales department of Doehler-Jarvis Corp., and over six years as executive vice president in charge of sales for Gerity-Michigan Corp.

Penn-Harris Steel Co. Inc., Harrisburg, Pa., elected **J. W. Patrick Jr.** as president and a member of the board. He joins Penn-Harris with many years' experience in the steel warehouse industry, associated with Edgar T. Ward's Sons Co., Peter A. Frasse & Co. Inc., and Follansbee Metal Warehouses.

William W. Jamieson was appointed vice president of industrial sales, and **Lewis C. Blackhall,** an assistant vice president of **Dearborn Chemical Co. Ltd.,** Toronto, Canada.

American Coach & Body Co., Cleveland, has opened new district sales offices in Chicago and Tulsa, Okla. The former is in charge of **Ruben Bauer,** sales manager for the midwest division. The latter is headed by **Homer Feyen,** sales manager, southwestern division. Other promotions include: **Arthur Frank,** sales manager, central division, with headquarters in Cleveland; **Robert Rector,** sales manager, southern division, with headquarters in Atlanta; **T. A. Pelsue,** sales manager, western division, with headquarters in Denver; and **William Higgs,** assistant sales manager, Cleveland.

I. P. Newby was appointed sales representative in the southwest Texas territory for **National Radiator Co.,** Johnstown, Pa.

David L. Cushing joined the Republic Rubber Division, **Lee Rubber & Tire Corp.,** Youngstown, as a field engineer, representing the company in Louisiana and parts of Florida, Mississippi and Alabama.

Lorne L. Caskey was appointed manager, tin plate sales division, **Republic Steel Corp.,** Cleveland, succeeding

LORNE L. CASKEY
. . . Republic tin plate manager

the late **J. G. Carruthers.** Mr. Caskey has been district sales manager for Republic Steel in Philadelphia since 1936, and five years prior to that time was assistant district sales manager in that city.

Charles Stiassni was appointed plant manager, **White Metal Mfg. Co.,** Hoboken, N. J. He previously was assistant manager of industrial relations for National Lead Co., and served as production supervisor for American Machine & Foundry Co.

A. M. Tinker was appointed Philadelphia district sales manager, American Chain Division, **American Chain & Cable Co. Inc.,** succeeding **R. C. Brenizer,** who will retire in August. Mr. Tinker has been with the company in New England for 28 years.

C. C. Clymer was appointed manager, materials handling and testing equipment division, **General Electric Co.'s** industrial engineering divisions. He succeeds **M. A. deFerranti,** appointed assistant to manager, parts division, aircraft gas turbine divisions. **Thomas Sproule,** production manager, Fitchburg Works, welding division, was appointed assistant manager of manufacturing for the Fitchburg turbine and welding divisions.

F. C. Senior is now associated with **Freyn Engineering Co.,** Chicago, subsidiary, Koppers Co. Inc. He joined Koppers in 1946 as chief engineer, metallurgical department, and was assigned to the Chilean steel mill project in New York. He acted as chief engineer of Corporation de Fomento for Koppers for the steel plant now going into production at Concepcion, Chile, until his recent transfer to Freyn Engineering Co.

Ralph B. Kraft, formerly Chicago sales representative, was appointed midwest representative for **Furnace Engineers Inc.,** Pittsburgh.

Ing-Rich Metal Products Co., East Palestine, O., organized less than a year ago, announces officers elected: Chairman of the board, **J. F. Ingram;** president, **E. E. Reagle;** vice president, **L. W. Ingram;** secretary and treasurer, **D. L. Brooks;** assistant secretary and treasurer, **F. B. Reese. Edgar F. Wainwright,** formerly sales manager, laundry and kitchen department, Hamburg Bros., Pittsburgh, is manager of sales for Ing-Rich, and in charge of kitchen cabinet and sink sales.

Herbert C. Lull was appointed sales

HERBERT C. LULL
. . . sales manager, Lull Mfg.

manager, **Lull Mfg. Co.,** Minneapolis. He was district manager in the Chicago zone for the Truck & Coach Division, General Motors Corp., and previous to that position was with

WILLIAM JONES
. . . new assignment, Armco Steel

GEORGE RAISELIS
. . . heads Bassick's purchasing

GENE D. SICKERT
. . . Indianapolis works mgr., Peerless Pump

the sales division of St. Paul Hydraulic Hoist Co. **Dan B. Daily** was appointed assistant sales manager, in charge of Traveloader sales.

William Jones was made administrative assistant to general manager of sales, **Armco Steel Corp.,** Middletown, O. He will continue close contact with electrical steel sales, operating and research problems. **E. A. Rickling** was appointed chief general accountant, replacing **C. D. Wilson.** At the East Works plant, **Vernon W. Jones** was appointed superintendent of steel production, **William Bergman,** superintendent of No. 1 open hearth department, and **Edgar R. Westfall,** assistant open hearth superintendent.

J. W. Baird was appointed superintendent of the Annandale Limestone Mine of U. S. Steel Corp.'s **Pittsburgh Limestone Corp.** at Boyers, Pa. He succeeds **R. S. Mitchell,** retired. **W. P. Druschel** succeeds Mr. Baird as superintendent of the Buffalo Creek Mine at Worthington, Pa.

George Raiselis was appointed head of the purchasing department, **Bassick Co.,** Bridgeport, Conn. He has been with the company 26 years, since 1949 as acting purchasing agent.

Sherman B. Margoles was appointed Milwaukee district sales manager, **Walker-Turner Division,** Kearney & Trecker Corp.

C. E. Wright, long identified with the steel industry, for many years as a business paper editor and more recently as a member of the Philadelphia office of Luria Steel & Trading Corp., New York, is going to Daytona Beach, Fla., to devote time to free lance writing for business publications and other magazines. Except for three years in the New York sales office of Republic Steel Corp., he was affiliated with *Iron Age* from 1917 to 1941, where from 1936 to 1941 he was managing editor. He then became vice president, Charles Dreifus Co. and the Dreifus Steel Corp., Philadelphia, which were recently acquired by Luria.

Gene D. Sickert was appointed works manager of the Indianapolis plant, **Peerless Pump Division,** Food Machinery & Chemical Corp. He formerly held a similar position with the Bolens Product Division.

George C. Sharp was elected a director of **International Nickel Co. of Canada Ltd.,** New York, filling the vacancy on the board of **John Foster Dulles,** who resigned following his appointment by President Truman as special adviser to Secretary of State Dean Acheson.

Burleigh E. Jacobs Jr. was named assistant sales manager, **Grede Foundries Inc.,** Milwaukee.

Blake C. Hooper was added to the sales staff of **P. W. Voss & Associates,** Chicago, sales representative for Automatic Transportation Co.

Daystrom Corp. has appointed **Theodore G. Hughes** general manager of all manufacturing operations in its plants at Olean and Friendship, N. Y.

OBITUARIES . . .

Brig. Gen. Charles L. Fike, 48, executive engineer under Maj. Gen. G. M. Barnes, vice president in charge of engineering, **Budd Co.,** Philadelphia, died May 3 as a result of injury sustained in an automobile accident.

Charles H. Awkerman, 60, chairman of the board, **Udylite Corp.,** Detroit, and active in the plating and rustproofing field since 1917, died May 7 in La Junta, Colo., while enroute to Chicago from Arizona. He joined Parker Rust Proof Co., Detroit, in 1917, becoming sales manager, vice president and later president when the Parker-Wolverine Co. was organized. Mr. Awkerman retired from business five years ago.

James H. Reichart, 64, president, **Excel Mfg. Corp.,** Muncie, Ind., died May 4 of a heart attack. Mr. Reichart attracted nationwide attention last summer during the polio epidemic by devising an iron lung which utilized two 50-gal. drums and a vacuum cleaner.

A. Sidney Keller, 52, vice president in charge of sales, **Chicago Metal Hose Corp.,** Maywood, Ill., died May 8.

Fay H. Willey, 53, founder and president, **Willey's Carbide Tool Co.,** Detroit, died May 6. He was one of the pioneers in development of tungsten carbide industry.

A. C. Streamer, 64, formerly vice president in charge of **Westinghouse Electric Corp.'s** East Pittsburgh Works, Pittsburgh, died May 4. A veteran of 40 years with Westinghouse, he retired in 1947.

Ambrose Bowyer, 67, for many years western manager, *American Machinist,* died in Los Angeles May 3. In 1921 he founded *Motor Service* magazine.

Harold Welch, 61, retired sales manager, New York district, **Pratt & Whitney Division,** Niles-Bement-Pond Co., died May 6.

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Control Room of open hearth pump station, showing Valimitor Starters for six 2300-volt motor-driven pumps.

they couldn't afford a SHORT CIRCUIT

PROTECTION IS UNLIMITED with EC&M VALIMITOR (VOLT-AMPERE-LIMITOR) STARTERS

There's no ceiling on VALIMITOR protection because fault currents are limited to a maximum of 25,000 KVA (steady state current) and the well-known Type ZHS Contactor used in these starters clears such faults quickly.

Because protection is *unlimited*—there's no need for calculating existing short circuit capability—no need to fear that these starters will be outmoded by future growth in KVA.

Also there are no fuses to replace after a fault. EC&M 2300-4600 volt VALIMITOR Starters give *permanent* protection.

Write for COMPLETE FACTS—ASK FOR No. 23 ACCELERATOR BULLETIN

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering
NEWS AT A GLANCE

MINIATURE PRODUCTION LINE— A special 6-foot round table jigging setup is one reason why Lima Register Co., Lima, O., turns out some 375 warm-air register assemblies per hour. Used in connection with a Sciaky welder that makes 125 welds per stroke in joining fins to each register, the table is positioned in front of the machine so work holding fixtures can be rolled into the welder. Actually, the table is a miniature "production line" that keeps four men occupied—three loading and one unloading the four roller-mounted fixtures.

LOW TEMPERATURE LUBRICANT TESTER—Heart of a semiportable low-temperature bearing lubricant tester developed by General Electric Co., Schenectady, N. Y., is a cooling chamber that resembles a large bucket with a smaller one inside. Cooling medium is dry ice placed in the space between the inner and outer buckets. In testing, a ball bearing is placed on a spindle in the inner bucket and rotated by a small electric motor. Tendency of outer ring of the bearing to move the inner ring is measured by a strain gage. If lubricant under test thickens in the cold atmosphere, the inner ring will not turn freely, and the gage registers a greater strain on the outer ring.

BROACHING "VERSATILIZED"— Once considered mainly a mass-production process, broaching now is so versatile it can be used in the tool room. A "flat-top" machine currently built by Colonial Broach Co., Detroit, permits handling of large as well as smaller parts without special fixtures to support the work. It can be employed either for general short-run or miscellaneous projects.

MAKES $133 MONTHLY SAVINGS— A sixteen - hundred-dollar investment in capacitors is currently paying dividends that average $133 per month at the Ashtabula plant of Reliance Electric & Engineering Co. They are paid as direct savings in power costs through ability of the capacitors to increase plant power factor. Before the installation, the plant's heavy induction motor load required magnetizing current which kept power factor low—an average of 82 per cent. Ten months after installation the power factor averaged slightly over 94 per cent. According to Reliance, original cost of the capacitors, including installation will be repaid in less than 13 months—but the dividends will continue to accumulate.

COMPLETE MECHANIZATION NOT HERE YET—Forecasts that the day is approaching rapidly when all kinds of products would be turned out without manual handling were soft-pedaled by C. E. Krause, president, Krause Design Inc., Rochester, N. Y., in a talk before engineers attending the recent ASTE show in Philadelphia. He stated that complete mechanization of plants where raw material is dumped into an automatic line at one end to come out as a finished product at the other is theoretically possible or practical in only occasional instances. Only a ball, he said, can be fed into a machine without ever being "wrong-end to". But there are seven wrong ways and only one right way in which some rectangular parts can enter a machine. Nevertheless he emphasized that concentrated studies of automatic handling mechanisms do pay off.

NO WRINKLING — Mass producing metal stampings by combining several die operations is not too unusual, but when one of these operations involves a 3½-inch draw at one end of a press equipped with air cushions—it's no ordinary achievement. As many stampers know, there is considerable danger of wrinkling when deep drawing in an air cushion press—unless the pressure is distributed uniformly around the draw ring. At Variety Machine & Stamping Co., use of one end of an air cushion press for deep drawing not only proved effective, but also helped step up production of toaster shells. (p. 78)

SPEEDS CRANE HANDLING— Prime factor expediting crane deliveries of bar stock in International Harvester's modernized screw machine manufacturing plant is a communications system that permits instantaneous two-way conversation between fixed stations and crane operators—and between crane operators themselves. Because all crane operators can listen in on all talks between the shed supervisor and screw machine superintendent arrangements for transfer of materials are carried out much faster. (p. 83)

CONSTANT SPEED CONTROL — Constant cutting speed control seems to be the only satisfactory answer to the problems of contour turning according to R. C. Montanus, vice president, Springfield Machine Tool Co. Proper cutting speed in the past was quite often a matter of an individual operator's choice. Modern carbide tools, he points out, cannot be so casually handled for they give best results within fairly narrow speed ranges. Tool life, finish and maximum production require precise control of cutting speed. But contour turning presents problems beyond the normal lathe. (p. 85)

STEEL ROLLING COSTS — If you want to see your rolling costs take a dip, it might be a good idea to cultivate the "man on the firing line"—your foreman. A method outlined by David R. Clements, chief accountant of Conners Steel Co., Birmingham, provides food for thought on what might be done to obtain maximum benefits from the men who have greatest influence over control of production costs. (p. 92)

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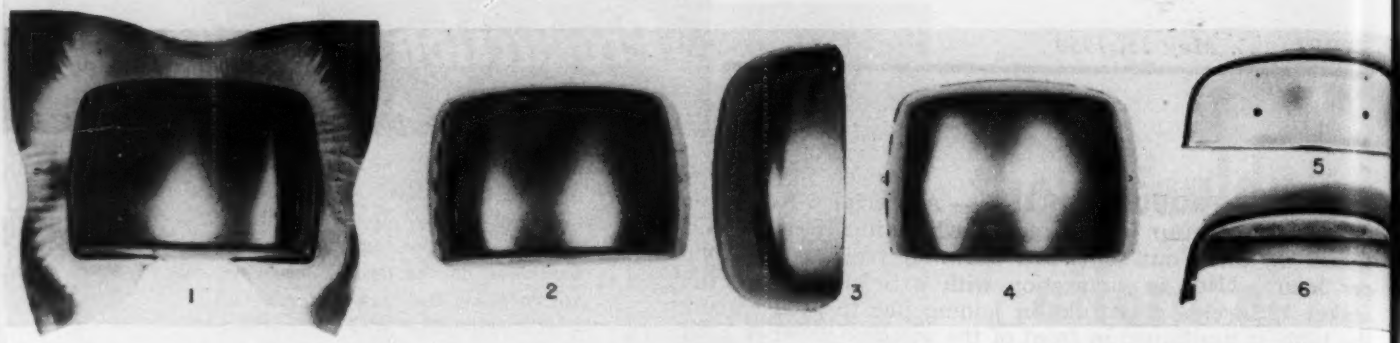


Fig. 1 (above)—Die operations required to produce the toaster shell are as follows: 1—Draw, 2—trim, 3—cam pierce, 4—emboss decorative design, 5—pierce locating holes, 6—trim bottom, 7—pierce regulator slot, 8—pierce bread slot, and 9—form bread slot

9 OPERATIONS

Cuts Stamping Costs

Fig. 2 (below)—Three dies showing first three operations being performed on the press; draw, trim and cam pierce

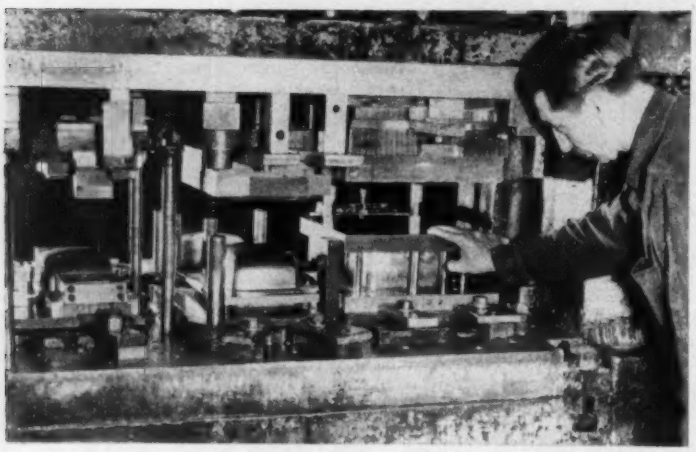
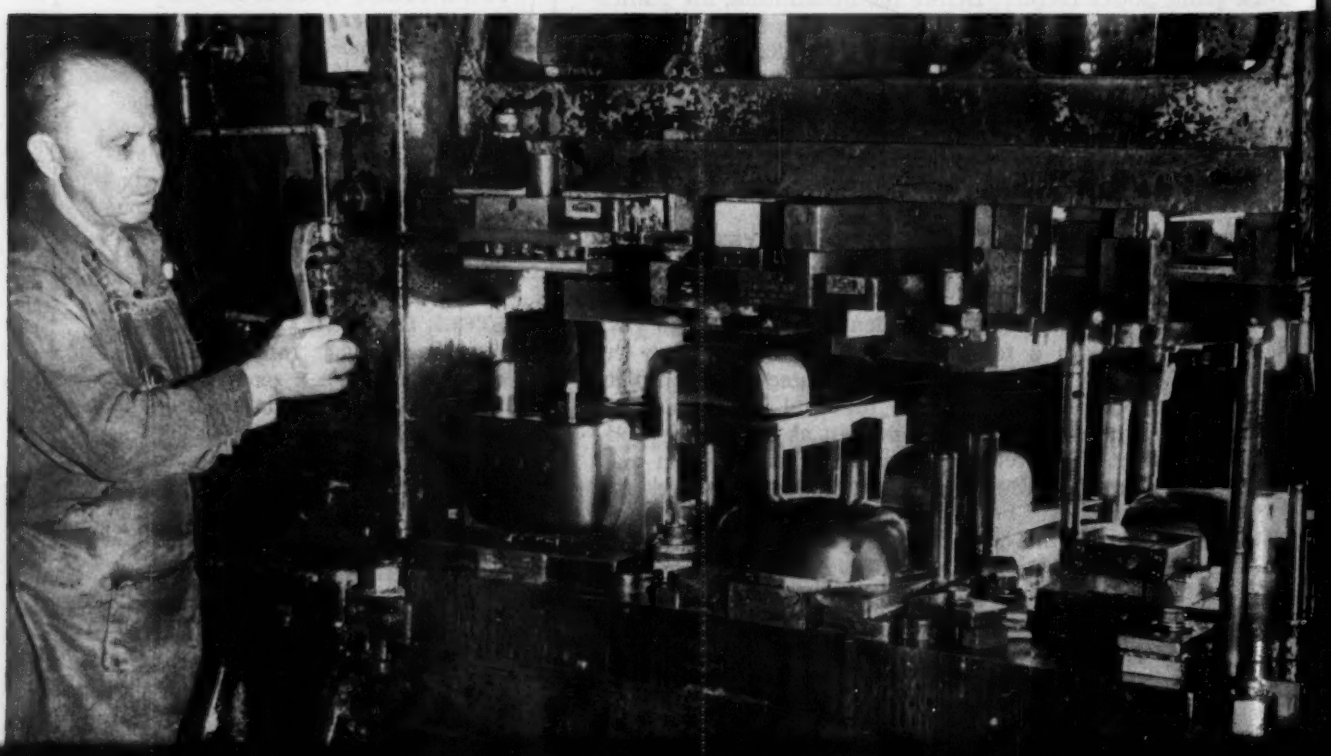


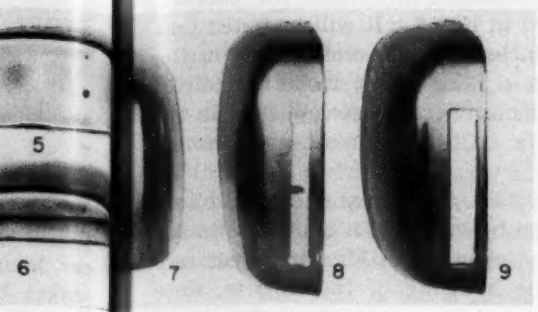
Fig. 3 (below)—Opposite side of press shown in Fig. 2. Emboss and pierce locating holes die set-ups are seen nearest operator

MASS production of metal stampings by combining several die operations in large bed-area presses is in itself not unusual. But, when one of these operations involves a 3½-inch deep draw at one end of a press equipped with air cushions, it becomes quite unusual.

This article describes how nine dies designed to produce a precision metal stamping were combined in two large bed-area presses to produce the outer shell of an electric toaster made for Dominion Electric Corp., Mansfield, O. During past six months, well over 200,000 of these pieces have been produced by means of the operations described.

Originally, the toaster shell was to be produced in nine separate die operations. The part was tooled-up to be produced in the customer's plant, and was run there for a period of time on nine separate presses. Due to influx of other business, it was found necessary to have these parts produced on the





NS ON 2 PRESSES

Costs of Toaster Shells

Improved procedure which is confined to two large bed-area presses, steps up hourly production, provides savings in manpower and materials by eliminating separate die operations

By WALLACE F. ARDUSSI
President
Variety Machine & Stamping Co.
Cleveland
Photography by Dan Reebel

outside. After examination of the dies, our engineers conceived the idea of combining the nine operations on two of our large bed-area presses. As a result of this analysis, the work was undertaken and five of our personnel were assigned to make the initial setup. This group comprised an engineer, a tool and die maker, two die setters and a supervisor.

The difficulties of obtaining the first satisfactory part should not be minimized, as it required a total of 60 hours of try-out and setup time to produce the first part that satisfactorily met blueprint specifications. However, after these initial difficulties were overcome, production was stepped-up to the present standard rate of 275 pieces per hour, and well over 200,000 satisfactory parts have been produced during the past six months.

Drawing Compound Important — Selection of a proper drawing compound helped very much, in the proper running of this job. During the trial period, experiments were conducted with 17 different types of drawing compounds. Out of these, only one keeps scrap, due to breakers, at a practical minimum, which we consider to be less than 3 per cent. This was a water soluble compound, No. 234, produced by the J. W. Kelley Co. of Cleveland, having both vegetable and animal fats with a pigmented base. Today all we need to do is substitute any one of the other 16 compounds, that have been tried, and scrap due to breakers immediately increases to 10 to 20 per cent. We are at a loss to explain this and know that the other makes of compounds work very well in other difficult drawing applications. However that has been our experience with this job.

The toaster shell job summary, shown elsewhere in this article, provides the basic manufacturing information relating to the production of this part. As was indicated, the most unusual feature of this setup is that it was planned to produce a drawn stamping that is drawn some 3¼ inches deep to final size in one operation, at one end of an air cushion press.

Experienced stampers recognize that there is a difficult problem of wrinkling when deep-drawn stampings are made in air cushion presses, unless the pressure is uniformly distributed around the draw ring. For this reason, it is customary to make difficult drawn stampings on air cushion presses by locating the die as nearly as possible in the center of the bed area, so as to achieve uniform pressure all the way around.

In this instance, it will be noted by referring to Figs. 2 and 3, that the first draw operation is located at one end of the bed and that the pressure has been equalized by means of four equalizer pins shown at the end of the bed opposite from the location of the draw die. The length of these equalizer pins has been determined experimentally by "cut and try", until it was possible to produce a stamping free from wrinkles. A variation in length of these equalizer pins of as little as 2 to 4 thousandths of an inch make the difference between satisfactory and badly wrinkled parts.

Scrap Kept To Minimum—One other difficult problem in connection with this type of production program, is the necessity for keeping scrap at a minimum.

Material used is a No. 3 finish, 0.032-inch, No. 4 temper, cold-rolled steel strip. This type of

Fig. 4—At left is seen the bottom trim operation and at right is the pierce regulator slot operation

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Fig. 5—Operation at left is the pierce bread slot and at right is the pierce regulator slot operation

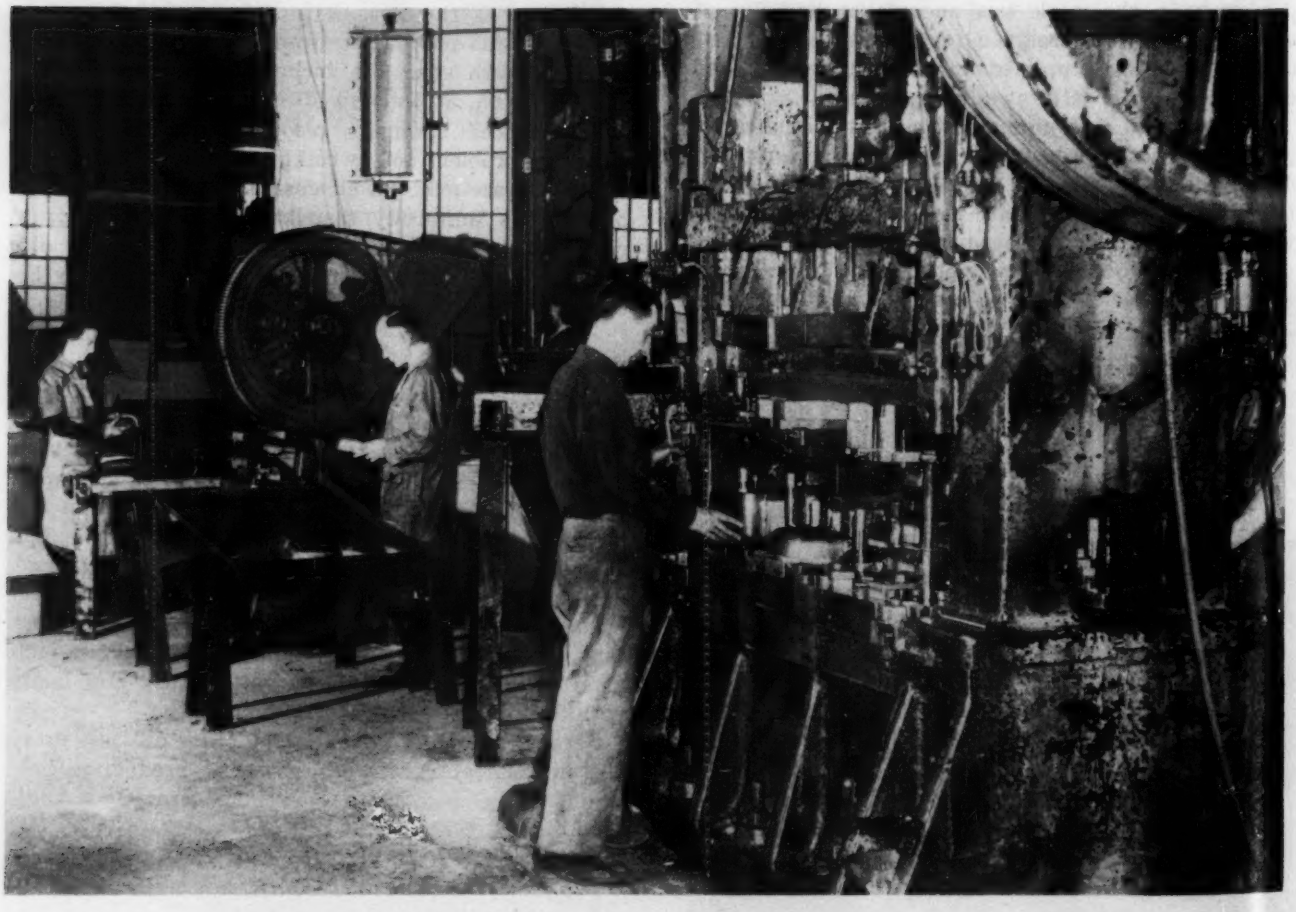
cold-rolled carbon steel is the most expensive of the commonly used carbon steel strip materials employed in the fabrication and manufacture of steel parts. Blank size is 12 x 15 inches. Since the material is so expensive, it is necessary that means and methods be worked out to keep the scrap at a minimum. Originally, when this job was set up, scrap ran rather high, but by means of setting up preventive measures, the job now operates at a maximum scrap allowance of 3 per cent which covers parts lost due both to wrinkling and breakers.

Samples of parts produced in each of the nine die operations are shown in Fig. 1. It will be noted that operations 1 to 5, inclusive, are accomplished in the first press. This is a Bliss press, model No. 2162. Operations 6 to 9, inclusive, are accomplished in the second press, which is a Clearing press, model No. F-1350-42.

The transferring of the parts from one press to another is accomplished by means of a chute shown immediately behind the operator in Fig. 6. Great care must be used in the handling of these parts, since they are chrome plated to a very high finish and must be entirely free from mars, dings and scratches. Therefore, it has been necessary to institute an educational program for the operators, to make sure that their handling of these parts does not produce surface metal defects.

Press Pressure Equalized—The first three operations are shown in Fig. 2. It will be noted that the press operator's hand rests on the draw ring for operation No. 1. At the immediate left of the draw die, appears the trim die and to the left of the trim die, is the cam and pierce die. It will also be noted that there are four large pins immediately surrounding the cam and pierce die which are the pressure equalizing pins going from the ram of the press, down to the air cushion pad underneath the bed. These four pressure regulating pins equalize the pressure across the air cushion pad and make it possible to

Fig. 6—At right is the Bliss press and in background are seen the Clearing press and personnel inspecting and packing the finished toaster shells



produce the deep drawn stamping at one end of the bed.

Embossing and piercing operations that are also performed in the first press are shown in Fig. 3. Following the piercing operation, the press operator removes the part, placing it in a chute which carries it to the next press. This also shows the safety control used which prohibits press operation unless operators on both sides of the machine actuate their respective controls simultaneously.

When the first press is in operation, a group of four people are required. These include a wiper, who wipes both sides of the original sheet, two operators for working the draw side of the press and one operator for working the opposite side.

The Clearing press, model No. F-1350-42, containing the four final die operations is shown in Fig. 4. At the left in the photograph is shown the operation that trims the bottom of the part. The right side shows the operation that pierces the regulator slot. Two operators, each servicing two dies, are required for this press, one on each side.

Operations 8 and 9 being performed on the Clearing press are shown in Fig. 5. It will be noted that the operation of piercing the bread slot is at the left and the operation of forming the bread slot is at the right of the photograph. Following this, parts are thoroughly inspected and packed into cartons for subsequent plating and shipping.

Preventive Measures Utilized — Successful production of precision stampings of this character that require a very high finish, is largely dependent upon quality control. It has been found most economical and practical, to use proper preventive measures to eliminate the production of defective parts. In the case of the toaster shells, the second operator is required to thoroughly inspect all of the stampings for dings and scratches. As soon as a scratch appears, he notifies the draw die operator and the press is stopped, so that the draw rings can be honed and polished.

This inspection station is very largely responsible for keeping scrap and defective parts at a minimum, because all bad parts are caught right after the first operation, rather than at the end of the production line.

In addition to this inspection station, there is a complete inspection of all parts before packing. It has been found that this keeps the quality of the job at a high level and prevents accumulation of excess scrap. It naturally follows that when dealing with expensive material, such as this No. 3 finish steel, it is necessary to use better than average precautionary measures to prevent high scrap losses and consequent high costs.

In this brief article, we have attempted to describe a novel method for producing a deep drawn precision stamping, at high rates of production. It has been pointed out that this is accomplished by combining dies in large bed-area presses, thereby requiring a minimum number of operators. This arrangement provides good production rates at minimum cost, and this is a highly desirable objective in the job stamping business today.

Two Concentric Diameters Ground Simultaneously

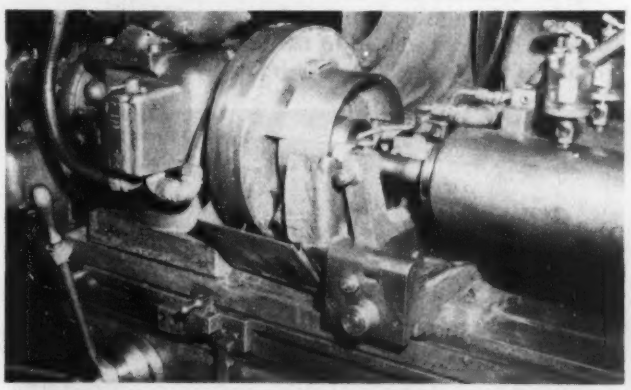
PARTS of pearlitic cast iron, termed clutch housings, are among many elements of the new Ultramatic transmission machined to close limits by Packard Motor Car Co. Quite unusual, however, is the setup here illustrated, in a Parker-Majestic grinder, as this machine grinds two concentric diameters at the same time.

Work Air-Clamped—One of these diameters is the outside of the hub and the other is the inside diameter of the rim. The work is air clamped in a chuck in which location is from the outer diameter of the rim and the back face of the workpiece. Grinding wheels are on parallel spindles and the distance between spindles remains fixed. Spindles turn at nearly the same speed but in opposite directions, both being driven by the same belt.

Diamonds for dressing the wheels are carried on the same yoke and dress both wheels at the same time, removing the same amount from each grinding wheel.

Wheels measure initially 1¼ inches in diameter, one having a ⅞-inch face and the other a 2-inch face. As one cuts on the pearlitic iron hub and the other on a steel ring brazed inside the rim, wheels of different grade are used.

Diameters Ground Concentric—Both wheels reciprocate at the same time while being fed radially to make cuts to the depth required to yield the correct diameters. Since the wheels make their cuts at the same time, the two diameters ground are truly concentric, a condition not always attained when different diameters of the same piece are produced in separate setups. There are also advantages in needing only one machine and one operator as against two in conventional setups, especially as the time per piece is about the same as for a single separate grind.



Setup for grinding simultaneously two concentric diameters of a clutch housing for a Packard Ultramatic transmission in a Parker-Majestic grinder

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MODERN WELDING TECHNIQUES

Cut Fabrication Costs of Solvent Extractor

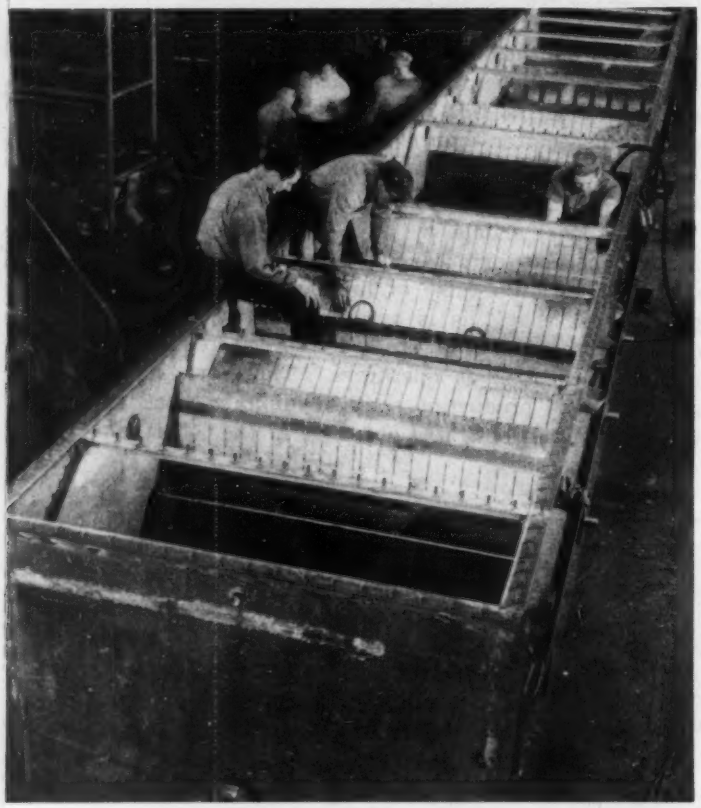

Fig. 1—Approximately 2500 stainless steel studs were used on this 68-foot continuous counter-current solvent extractor

Fig. 2—Stainless steel slats on these impeller wheels which perform the conveying function within the extractor, are spot welded to tie bars. These, in turn, are held to the impeller wheel frame by welded studs

EXTENSIVE use of modern welding techniques by Vulcan Copper & Supply Co. is enabling this company to bring the cost of their solvent extractor within the economical reach of many oil processors. Stud welding and inert gas tungsten arc welding were employed in the manufacture of a recent stainless steel extractor. Stud welding sharply reduced the amount of stainless steel required, without impairing the strength of the finished product.

The finished extractor measured 68 feet in length, 8 feet in width, 6 feet in height, and weighed approximately 18 tons. A Reeves variable speed drive and individual worm gears power the 15 extraction sections. The entire unit has a liquid and vapor-tight construction.

Fabrication Procedure—Stud welding was used at five different points in the fabrication procedure to obtain important manufacturing economies and improved design of the extractor. Stud location was first determined by the usual layout and center punch method. The welding operator then chucked the stud and protective ceramic ferrule in the lightweight, portable Nelson stud welding gun, placed the point of the stud in the center punch mark, and pulled the trigger. The entire welding operation was completed in a few seconds.

Welding power was supplied by a NEMA rated 400 amp dc welding generator used in the plant for other welding jobs. Lengths of welding cable gave added flexibility to the equipment, permitting the operator to make a great many welds without moving the welding generator or control equipment.

Studs used around the sides of the extractor were ½ x 1-inch M/G stainless studs, while those end welded to the frame tie bars were ½ x 1½-inch. Cover plates were drilled for the studs, placed in position, and fastened with nuts. Gaskets mounted on the tie bars completed the liquid and vapor seal along the top of the unit.

Sampling Ports—A large number of sight glasses and sampling ports along both sides of the extractor are of quick-opening design for easy access to the interior of the machine whenever required. Covers for these openings are held in place by wing-nuts threaded onto ⅜ x 2-inch M/G stainless studs. Three studs are used for each opening. Following the same method employed in locating the studs along the top of the extractor, a small template was used to determine the position of the studs around the openings.

Bearing housings for the individual gear reduction units which drive the agitator paddles are secured to the extractor frame by eight ½ x 2½-inch M/G stainless studs for each housing, with a total of 240 studs required.

Covers for the individual gear units were also fastened to the extractor frame by end welded studs. Three ¼ x 1-inch M/G stainless studs were welded in place for each cover.

Stud welding played an important part in the fabrication of the fifteen stainless steel impeller wheels. The stainless slats were first spot welded to the wheel tie bars, which were then fastened to the impeller wheel frame by stainless studs welded to the frame members.

Instantaneous Communications Expedite

CRANE DELIVERIES OF BAR STOCK

By ERLE ROSS
Chicago Engineering Editor, STEEL

Frantic foremen, puzzled cranemen and idle machine operators waiting for bar stock are nowhere to be seen at International Harvester's modernized bolt, nut, rivet and screw machine product manufacturing plant. Absence of frayed nerves and inefficiency is the result of a newly-installed method of maintaining contact between crane operators and ground personnel

CRANE deliveries of bar stock at International Harvester Co. are expedited by a telephone-type communication system which permits instantaneous two-way conversation between fixed stations and crane operators and between crane operators themselves. The new system is a prime factor in promoting efficiency at the recently-modernized bolt, nut and rivet and screw machine product manufacturing plant at the company's West Pullman Works, Chicago.

Embracing approximately 254,000 square feet, the plant is served by a number of overhead cranes, nine of which are required to cover a considerable amount of floor area. Some of the cranes travel from one building to another.

Referring to the plant layout, Fig. 1, it will be observed that the 5-ton crane "B" is required to receive steel bars from the 10-ton crane "A" in the steel shed building and deliver these bars to the 2-ton crane "C". This transfer of material presented the usual problem of how to get in touch with the three crane operators in minimum time when their services are required.

D. F. Redman, plant engineer at the West Pullman Works in charge of this particular phase of construction, conceived the idea that if these cranes and the superintendents' offices were to be equipped with a satisfactory type of telephone, the handling of ma-

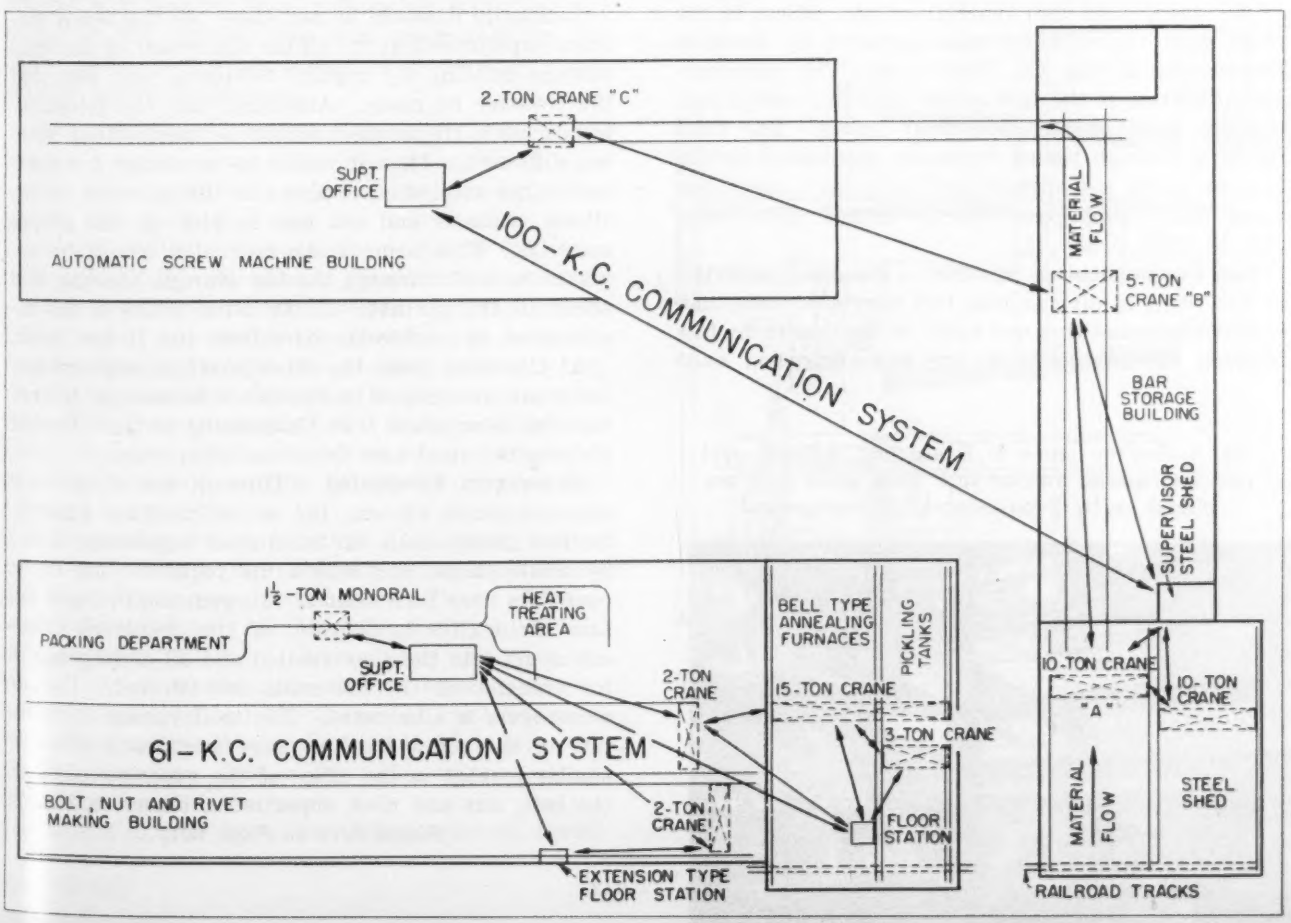

Fig. 1—Layout of automatic screw machine department and bolt, nut and rivet manufacturing department showing the two basic communication systems

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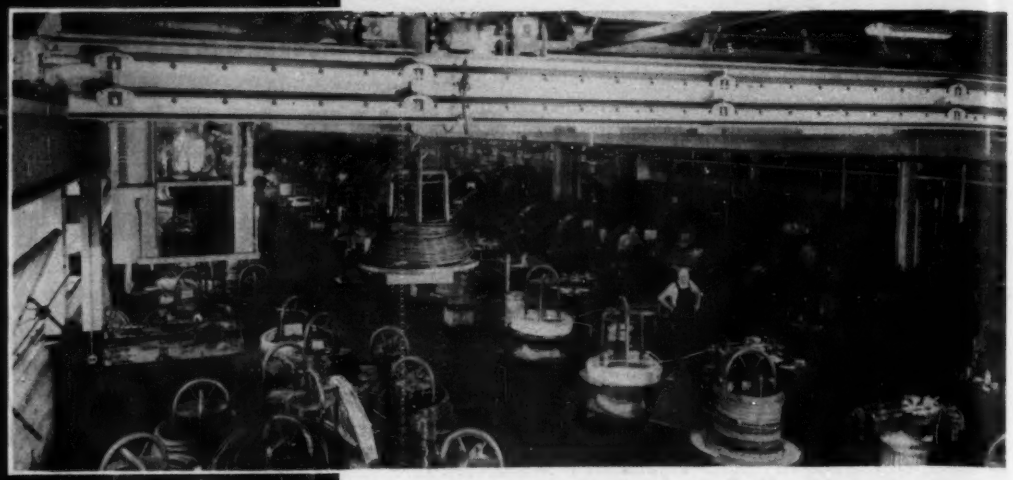

Fig. 2 (left)—Microphone and loud speaker are mounted directly in front of superintendent's desk. Speaker volume is adjusted to enable office personnel to hear conversation from crane operators

Fig. 3 (above)—This 2-ton crane delivers coiled stock to boltmaking machines, transfers partially completed product from one operation to another. Activities of both cranes in this building are directed from several floor stations

terials could be effected quickly and efficiently.

Answer to the problem consisted of equipping all of the cranes and two superintendents' offices in the plant with trolleyphones manufactured by Farmers Engineering & Mfg. Co., Pittsburgh. This communication system is the first of its kind in a metal fabricating plant on standard shop cranes. The units function through use of frequency modulated carrier current which is transmitted directly over the trolley wires that supply power to the cranes. See STEEL, July 18, 1949, p. 86.

Two Communication Systems — Handling materials in the plant is divided into two unrelated communication systems. Because there is no reason to talk between the two systems, the communication units are arranged to operate on two different frequencies.

The trolleyphones in the screw mcahine product system operate on 100 kc, while those in the bolt, nut and rivet manufacturing system operate on 61 kc. There can be no interference between these two systems.

To illustrate the use to which the trolleyphones are put, assume the superintendent in the automatic screw machine building requires bar stock that is in either the bar storage building or the steel storage building.

Ordinarily it would be necessary for the screw machine superintendent to call the supervisor of the steel storage building by regular telephone and ask that the transfer be made. Assuming that the telephone is not busy, the request would be transmitted without difficulty. Then it would be necessary for some one in the steel shed to shout to the operator of the 10-ton crane A and ask him to pick up the proper material. This same messenger also would be required to walk through the bar storage building and shout to the operator of the 5-ton crane B his instructions to receive the bars from the 10-ton crane.

At the same time, the screw machine superintendent would be obliged to dispatch a messenger to contact the 2-ton crane C in his building so that it could pick up the steel bars from the 5-ton crane.

Messengers Eliminated — Through use of the new communication system, the screw machine superintendent simply calls the steel shed supervisor direct by trolleyphone and makes his request. All crane operators hear both sides of this conversation and before the matter is disposed of the operators themselves get into the conversation and all arrangements for transfer of the materials are effected. Use of messengers is eliminated. The trolleyphone installation in the screw machine superintendent's office is similar to that in the office of the superintendent of the bolt, nut and rivet department, shown in Fig. 2.

(*Please turn to Page* 101)

Fig. 4—Five-ton crane in foreground delivers steel bars into special transfer rack from which they are picked up by 2-ton monorail in background

UNIFORM Surface Speed

The Answer to Contour Turning Problems

Growing importance of contour turning and increased use of carbides have sparked application of electrical drives for regulating spindle speeds to suit work diameter

By R. C. MONTANUS
Vice President
Springfield Machine Tool Co.
Springfield, O.

ONLY satisfactory answer to the problems of contour turning seems to be variable spindle speed control.

Proper cutting speed in the past was quite often a matter of an individual operator's choice. Modern carbide tools cannot be so casually handled for they give best results within fairly narrow speed ranges. Tool life, finish and maximum production require precise control of cutting speed. But contour turning presents problems beyond the normal lathe.

Latest answer consists of using an electrical drive —a variable voltage motor-generator set with electronic field control.

Previous solutions to this problem were largely governed by the drive means available. A patent dated 1882, Fig. 1, shows the solution dictated by the old belt drive. Variable speed of the spindle is obtained by sliding a belt along two opposed cone-shaped drums. This sliding belt is controlled by means of a screw-driven shifter that is belted to the change gear system of the lathe. When the lathe is in operation, the belt slides along the drums at a fixed ratio to the movement of the cross slide.

With the advent of the individually motor-driven lathe, a new approach was opened through the use of a direct current motor with rheostat control. An application of this drive and its control is shown in a patent dated 1905, Fig. 2. The spindle speed variation is controlled by a rheostat adjusted by a cam operated in conjunction with the longitudinal motion of the carriage. It is interesting to note that this control was applied to a contouring lathe and the shape of the control cam was determined by the shape of the part being turned. This required a new cam for each different part.

Curve Expresses Problem—Problem of constant cutting speed in turning best can be expressed by a simple curve which runs to infinity at each end. This curve, Fig. 4, is the same for any cutting speed, whether it is 100 surface feet per minute or 400 sfpm, as it is nothing more than a graphical expression of a simple quadratic equation. Given a particular cutting speed, if you double the diameter you halve the spindle speed. Though the problem is simply expressed, the solution is not so simple—for we have no variable drive available today with a wide enough range to cover the entire curve or even the comparatively narrow portion of this curve required for our 14-inch lathe.

In examining the application of constant cutting speed control to a lathe, all of the many variable drives available were investigated. These are generally classified as: (a) Mechanical, (b) hydraulic, (c) electrical. Electrical drives were the most desirable for our application. After weighing the mechanical and electrical advantages of various drives, we decided on the Westinghouse AV drive with constant horsepower. This is a variable voltage motor-generator set with electronic field control. On the application of this drive to a lathe, constant horse-

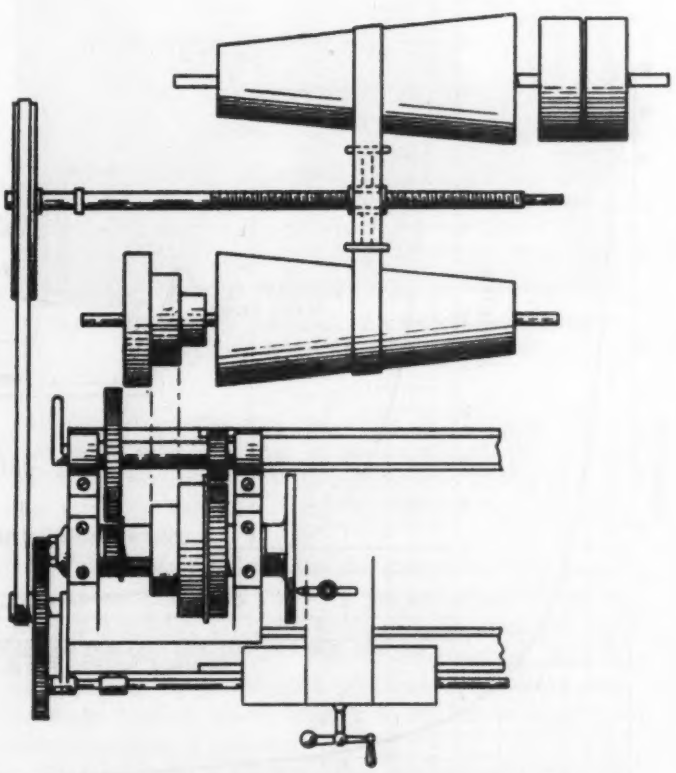

Fig. 1—Solution of the problem of constant cutting speed using belt drive (1882 vintage)

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power is necessary. In computing the horsepower requirements of a lathe, four factors must be considered—(1)Cutting speed in surface feet per minute, (2) depth of cut, (3) feed, (4) the material factor. This can be expressed by the formula "Horsepower = S x F x D x M." Since depth of cut, feed and material remain constant, and since our constant cutting speed control gives constant surface feet per minute regardless of the diameter being contoured, then, by the formula, we see the horsepower requirement is constant.

Referring to Fig. 3, it is readily seen that in selecting the proper AV drive for the average range of diameters encountered in contouring on a given size machine, definite high and low limits had to be selected. The machine shown in Fig. 5 is the Springfield 20-inch heavy duty lathe with hydraulic contouring attachment. For this size machine, an AV drive with constant horsepower over a speed range of six to one was selected because this gives excellent control over the most used portion of the curve. Portion of the curve used is from 2-inch minimum diameter to 12-inch maximum diameter. This covers the greater part of the capacity of this machine because the maximum diameter we can contour over the carriage or between centers is 12⅝ inches. On a machine of this size, diameters smaller than 2 inches are seldom encountered.

Control of Drive—Control of the AV drive can be handled by either of two devices, a simple potentiometer or a reactor. We have actually used both of these devices. For normal operation of the lathe, we provided the potentiometer mounted in a push-button station on top of the headstock. For automatic operation in conjunction with the contouring attachment, we have used the reactor. A selector switch mounted with the potentiometer enables us to select the control we desire. The reactor is used for the automatic control because it gives stepless speed variation. This reactor is simply a coil with an armature suspended in its field, but has no physical contact with it. Control is obtained by varying the position of the armature in the field.

Hydraulic Contouring Attachment—In applying the automatic control to our hydraulic contouring attachment, we had to consider the many variables in this particular design. It is a universal design that may be used for a wide variety of turning and facing operations or combinations thereof. Essentially, it is a self-contained unit that mounts on the bottom slide in place of the normal compound rest. The tool slide, which carries a turret, incorporates the actuating cylinder and also mounts the hydraulic control valve. For shaft contouring, the template is held in a template support that is moved in and out with the bottom slide for diametral adjustments, and is held longitudinally by two supporting brackets.

For facing work, a special template support is mounted on the carriage wing and is perpendicular to the longitudinal axis of the machine. The wide variety of work encountered in contouring requires that the tool slide be set at various angles to the longitudinal axis of the machine. The contour is produced by a combination of the normal longitudinal movement of the carriage and the hydraulically controlled movement of the tool slide along an angle that has been determined from the shape of the contour to be

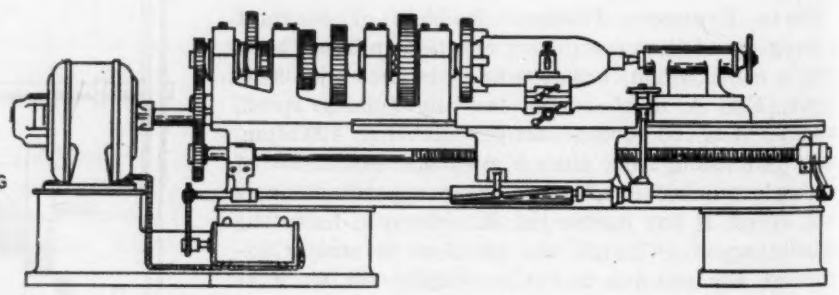

Fig. 2—Direct current motor with rheostat control (1905 vintage)

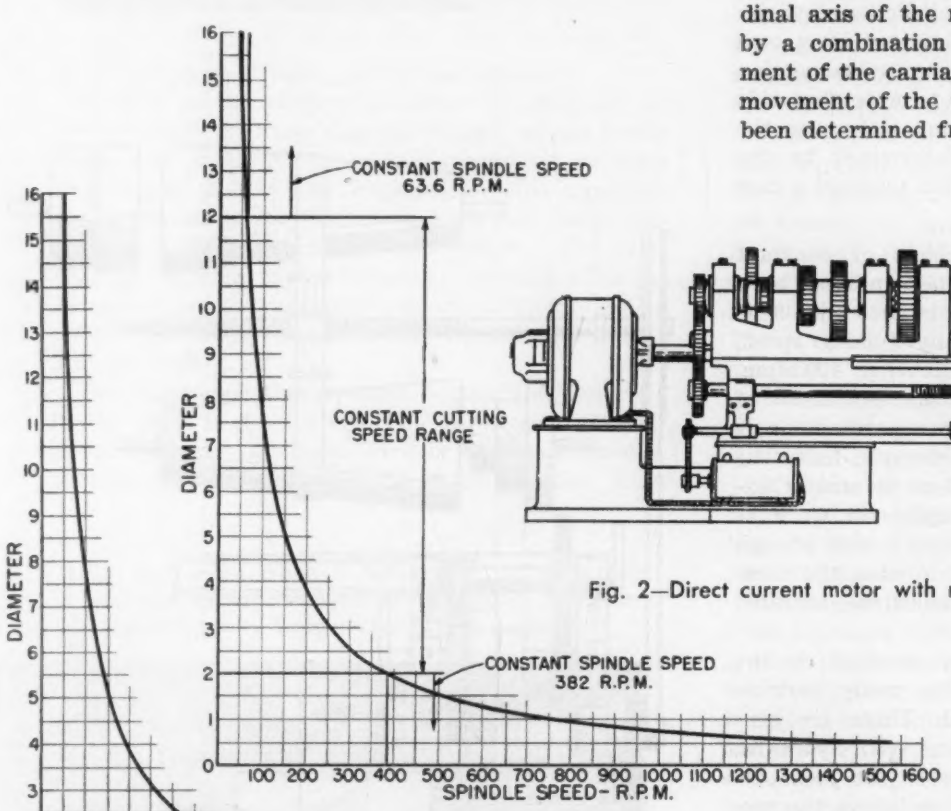

Fig. 3—Curve of speed control; constant cutting speed attachment with AV drive, six to one range, constant horsepower

Fig. 4—Constant cutting speed curve

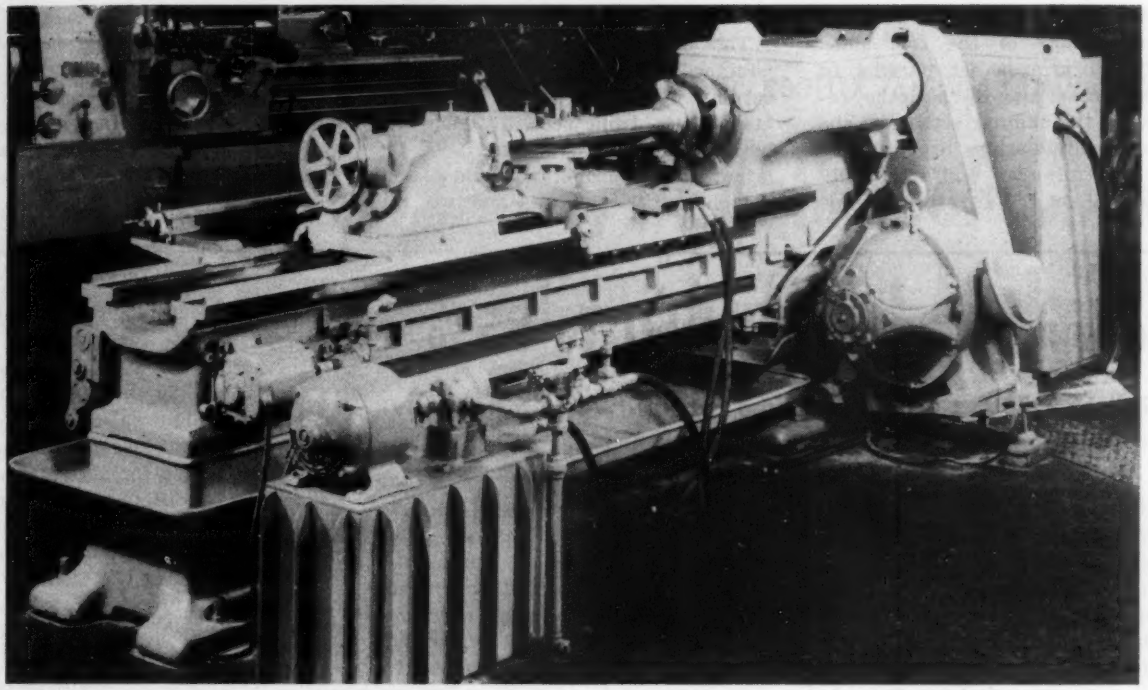

Fig. 5—View of Springfield 20-inch heavy duty lathe with hydraulic contouring attachment and type AV drive with constant horsepower

turned. Usually, the tool slide of the machine is set at an angle that bisects the angular limits of the contour.

Since constant cutting speed control depends upon the true radial position of the tool, the angular motion of the tool slide in terms of radial change had to be interpreted. To do this, we used the unit shown in Fig. 6.

This unit had to be as flexible as the tool slide in order to handle the various tool slide angles that are used. It consists of a small totally enclosed reactor assembly adjustably mounted on the wing of the carriage, and a control arm mounted on the side of the tool slide. The reactor assembly of the unit encloses the reactor coil, cam follower slide and operating cam.

The cam follower slide moves at 90 degrees to the longitudinal axis of the machine and, therefore, its position is a direct indication of diameter. Shape of the cam is such that it controls the reactor to give the proper spindle speed for the diameter indicated by the position of the cam follower slide. This position is indicated on a scale graduated in inches of diameter.

In calibration of the cam, we first set the slide at a definite positon—say 2 inches in diameter —then, by means of an adjusting screw, move the cam blank until the proper spindle speed is obtained. We then transfer the position of the cam follower roll to the cam blank. This operation is repeated in increments of ¼-inch in diameter over the full range of control. We then remove the blank and are able to draw the proper curve of the cam.

This is a simple method of combining the constant

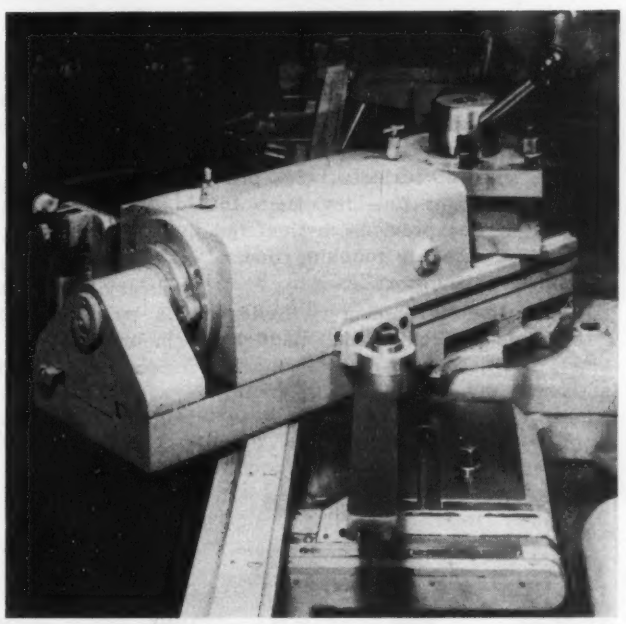

Fig. 6—Unit which interprets the angular motion of tool slide in terms of radial change

cutting speed curve and the curve of reactance of the reactor to give us a cam of the proper shape. After we have completed this operation, we cut the cam to the shape of the curve that is obtained by this calibration.

To enables us to operate the unit from zero diameter to its maximum capacity, as indiacted in Fig. 4, we cut the cam straight from zero to 2 inches and from 12 to 14 inches. This gives constant spindle speed along those straight portions of the cam and constant cutting speed from 2 to 12 inches over the curved portion of the cam.

Control Arm Adjusted—The control arm can be adjusted along the entire length of the tool slide as well as angularly to it. This allows for the use of

From data presented before the 14th annual machine tool electrification forum, Westinghouse Electric Corp., Buffalo, April 25 and 26.

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different length tools and for different angular settings of the tool slide. The control arm is set parallel to the longitudinal axis of the lathe, regardless of the angular setting of the tool slide. Graduations are provided on the control arm, and it is only necessary to set the arm to the same setting as the tool slide.

This arrangement works very satisfactorily on normal boring and turning operations where the diameter varies from zero to maximum by moving toward the front of the lathe. But, as usual, someone had to complicate the picture and we ran into a customer who wanted to reverse the machine and bore on the back side and of course this threw our constant cutting speed control into reverse. We were able to meet this condition merely by changing the position of the armature in the reactor coil.

Machining Time Trimmed 50 To 85%

Rolling mill roll production time cut from 34 to 6 hours by new hydraulic duplicating lathe

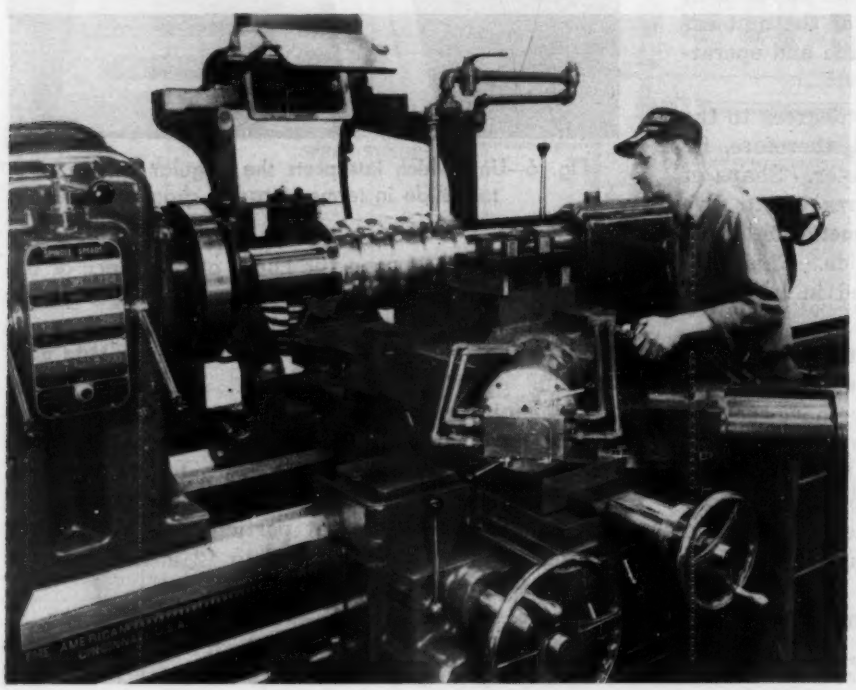
COMBINING fast machining with smooth surface finish, a new hydraulic roll-duplicating lathe is producing rolling mill shape rolls at a fraction of their former cost. In operation in a leading steel plant, the lathe has cut machining time from 50 to 85 per cent and eliminated subsequent finishing operations.

The chilled iron roll (65 scleroscope hard) shown in the accompanying illustration, was completely finished from the blank in 6 hours; 3½ hours for roughing and 2½ hours for finishing, without tool wear. Use of harder grades of carbides holds promise of reducing finishing time to 1½ hours. The previous method required 30 hours for roughing and 4 hours for finishing.

Duplicating Mechanism — Salient feature of the equipment, made by American Tool Works Co., Cincinnati, is the use of a hydraulic duplicating mechanism for controlling the cutting tool as it reproduces from a template the desired roll shape on either chilled iron or steel roll blanks. The mechanical feed, through the conventional quick change gear mechanism, is continuous while the tracer controlled angular slides give stepless generation of the contours, which is largely responsible for the high degree of accuracy and finish on the rolls.

Standard round nose cemented carbide cutting tools are used for both roughing and finishing operations in lathes driven by motors up to 50 hp.

For generating the roll grooves a dual slide, all-hydraulic duplicating mechanism is provided. Slides have nitrided guideways for permanent accuracy. The two slides, one of which is superimposed on the other, are mounted at 45 degrees to the work axis and at 90 degrees to each other, with the cutting tool mounted on the upper slide. With this combination of slides any conceivable roll shape can be generated.



Instantaneous Slide Selection—Instantaneous selection of the slide desired for operation is accomplished by a directional lever which operates a selector valve for activation of the slide. An additional operating convenience and safeguard is provided by a hydraulic lock controlled by a small operating lever at the front by means of which the functioning of the duplicating mechanism is arrested while the cutting tool is being retracted from a groove. This eliminates any danger of bumping the tool against the slides of the groove during withdrawal. After withdrawal of the cutting tool this same lever, when thrown in the opposite direction, releases the hydraulic lock and permits the tool slide again to advance to the work by power, reducing operative effort to a minimum.

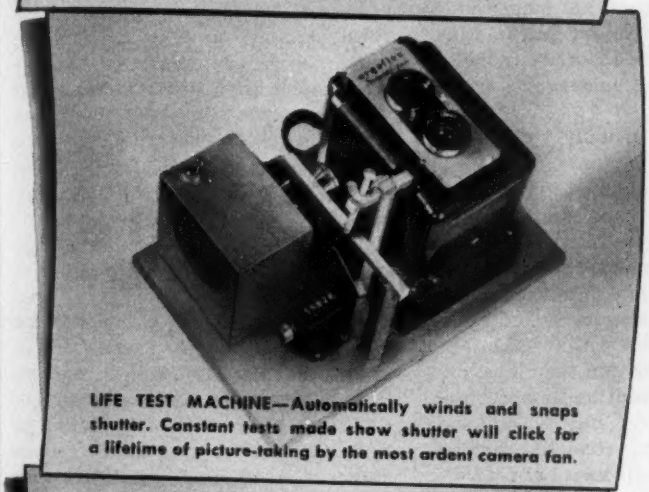
A valuable operational aid is provided by a compound illuminated mirror located at the rear of the carriage above the template. This gives the operator a bird's-eye vision of the template and the stylus so he may know at all times exactly what is happening regardless of the diameter of the roll being machined or whether tool is hidden by coolant. This is particularly valuable when machining large diameter rolls which entirely obscure the operator's vision of the template and stylus.

Template Adapter — A template adapter is provided so that narrow, thin templates may be used—regardless of the roll diameter. It also provides for the use of long templates in sections which greatly simplify the job of template making.

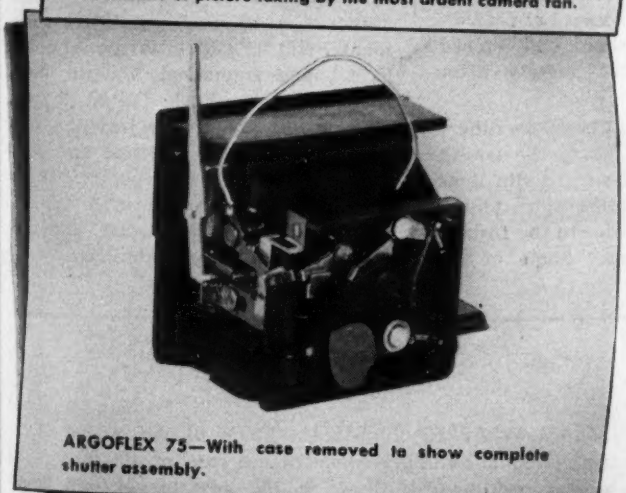
Cutting tools are held in a 4-stud tool holder. Long tools are supported by underneath, adjustable supports extending out to impart maximum rigidity and life to the tools. When tool changes are required, and also for the original tool setup, tool setting gages are used which make tool setup a matter of a couple of minutes instead of the tedious job it would otherwise be.

American hydraulic roll-duplicating lathes are made in several sizes to accommodate various sizes of rolls up to 34 inches diameter.

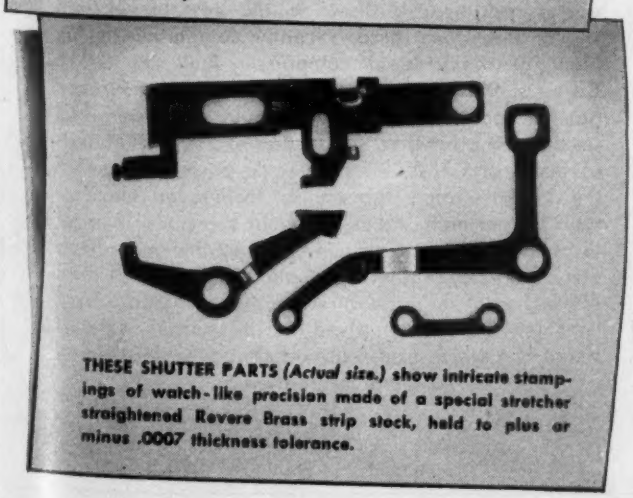
ARGOFLEX 75 CAMERA—Most popular in the Argus line.



LIFE TEST MACHINE—Automatically winds and snaps shutter. Constant tests made show shutter will click for a lifetime of picture-taking by the most ardent camera fan.



ARGOFLEX 75—With case removed to show complete shutter assembly.



THESE SHUTTER PARTS *(Actual size.)* show intricate stampings of watch-like precision made of a special stretcher straightened Revere Brass strip stock, held to plus or minus .0007 thickness tolerance.

WHY THE ARGOFLEX 75 GIVES CAMERA FANS

A Lifetime of Clicks without Kicks

Revere Brass used in shutter mechanism combines special tolerances and watch-like precision with durability and low cost

IN developing the shutter mechanism for their Argoflex 75 camera, engineers of Argus, Inc., Ann Arbor, Mich., had to cope with an unusually tough combination of problems. Production called for progressive die stamping operations, while to further complicate matters the stamped parts had to be constructed so as to incorporate the added feature of making double exposures impossible. The stock used had to be in strip form and without camber.

At the same time tolerances of 1/1000 to 2/1000 of an inch had to be maintained throughout the entire length of the strip, because the shutter parts had to function with watch-like precision. All of these requirements were necessary to maintain constant shutter speeds for consistent photographic results. In addition, the parts had to be durable, low in cost, and require only a minimum of hand finishing.

Together, Argus engineers and Revere's Technical Advisory Service worked on these complex problems. It was agreed that brass be used because of its workability and freedom from corrosion. Revere supplied a special stretcher straightened brass strip stock held to plus or minus .0007 thickness tolerance.

That this Revere brass strip more than adequately answers all the Argoflex 75 requirements for special tolerances, precision, durability and low cost, is borne out by its performance in operation. Said the Argus people: "Your (Revere's) Technical Advisory Service assisted us in solving these problems to our unlimited satisfaction."

In order to determine how the camera shutter mechanism would stand up in use, Argus has designed the machine you see at left which automatically winds and snaps the camera. These tests which are constantly being made on current production show the life of the camera to be far greater than the number of pictures the average photographic fan takes in an entire lifetime.

Perhaps Revere Brass or some other Revere Metal can be of help in developing or improving your product —cutting your production costs. Why not tell Revere about *your* metal problems? Call the Revere Sales Office nearest you today.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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Minute Areas Identified

Crystal orientation study makes use of Monel metal specimen, polarized light

ABILITY of a metal to deform plastically without breaking enables it to withstand misalignments and changing stress conditions occurring in machinery and structures. Shaping of a metal by rolling, pressing, drawing or forging is also dependent on its ability to deform plastically. In order to obtain maximum service from machine parts and other metal products, it is necessary that a thorough knowledge of factors involved in the plastic deformation of metals be known.

Changes in the orientation of the crystals, or grains, that make up the commercial metals are known to play an important part in the deformation process. Use of the usual x-ray diffraction methods to study grain orientation has been found unsuccessful where only minute areas are involved. One difficulty has been the identification of the area from which the diffraction pattern was first obtained.

In a course of study of plastically deformed Monel metal, D. H. Woodard of the National Bureau of Standards, Washington, developed a technique which uses polarized light to make visible differences in orientation that result from the deformation of a fully annealed specimen. Method is expected to find application in studies of plastic deformation in other metals.

Optically Active With Light Etch—When this metal is polished and treated with most etchants, it is optically isotropic, reflecting polarized light equally in all directions. When given a light etch, the surface becomes optically active. Under this condition polarized light can be used to detect differences in grain orientation. Monel that has been annealed so as to give a uniform point-to-point orientation within individual grains was viewed microscopically under polarized light with polarizing elements in the incident and reflected beams crossed.

Intensity of reflected light was uniform over each grain. When the annealed Monel was deformed before sectioned and polished, intensity of the reflected light was no longer uniform over the individual grains, thus making it possible to study visually regions which had undergone orientation changes.

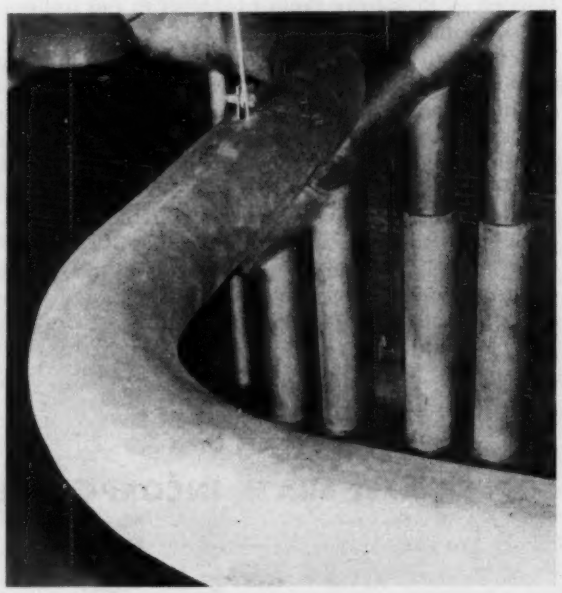
"Slip Lines" Usually Visible—Tensile specimens that had been given different amounts of plastic extension were sectioned and polished and used to study effect of increasing plastic deformation on changes in orientation within individual crystals. From the irregularity of these changes, it was evident that directions of flow varied within small areas and that the deformation in individual grains was by no means uniform or regular. Thin, straight parallel lines known as "slip lines" are usually visible on polished and etched surfaces of annealed metals after slight deformation.

Use of polarized light to show differences in orientation along the length of a line indicated that the slip lines were traces of crystallographic planes that had been bent prior to the formation of the slip lines. Some of the differences in orientation observed in individual grains, which were more pronounced after severe plastic deformation, may therefore be interpreted as bending of the crystal lattice. This bending of the crystals during plastic deformation leads to the development of deformation bands. As deformation proceeded, these bends behaved as individual crystals and thus could be considered as fragments of the original crystal.

It was found that the total intensity of the combined reflections from many grains varied as the specimen was rotated with respect to the plane of polarization. It appears that polarized light might be used to detect preferred orientation resulting from such shaping process as drawing, rolling and stamping. It has also been found that other cubic metals such as copper, aluminum, nickel and alpha iron can be made optically active; thus the application of polarized light can be used in the study of a number of commercial metals.

How To Install Mineral Wool

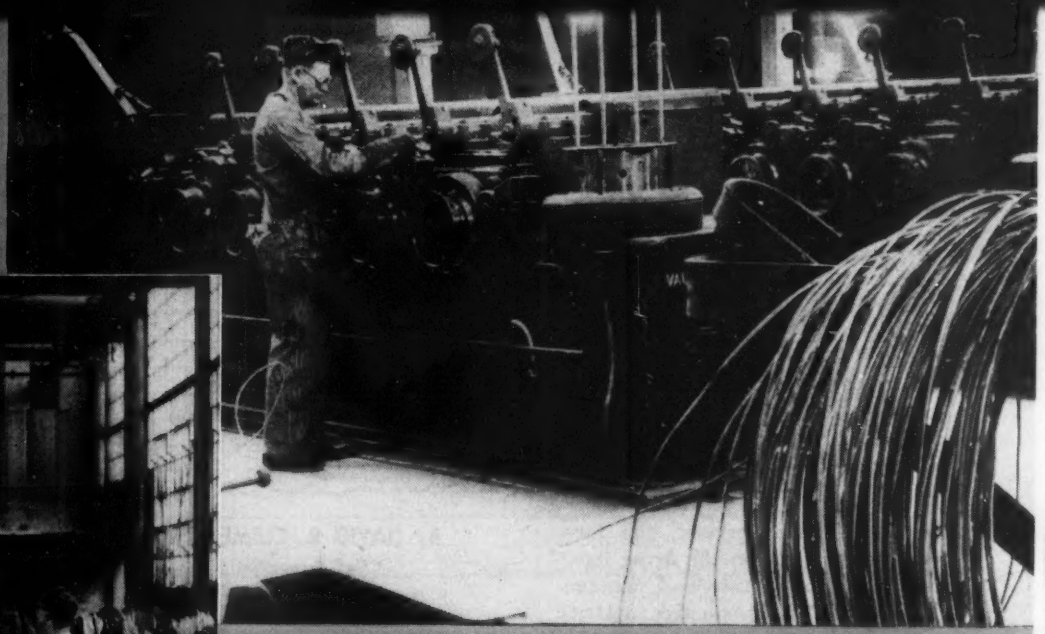
SIX methods of installing the felt, blanket, block or board forms of mineral wool are included in the National Bureau of Standards bulletin CS117-49, mineral wool insulation for heated industrial equipment. Revised standard, available from U.S. Government Printing Office, Washington 25, D. C., and Industrial Mineral Wool Institute, New York 17, N. Y., includes data on characteristics and properties of the material and provides thicknesses for specific ranges of hot-surface temperatures, besides listing auxiliary materials and explaining installation techniques.



STEAM WRAPPED IN STEEL: Some of the piping employed in handling steam at the rate of 400,000 pounds per hour is shown in the new power and steam generating plant recently completed at the plant of major steel company. Built by Dravo Corp. of Pittsburgh, the unit employs blast furnace gas to boost steam output without increasing fuel costs in the additional production of 200,000 pounds of steam and 7500 kw of electric power. Some of the intricate pipe fabricating techniques may be seen in the main steam line from the boiler header to pressure reducing station. It is 12 inches in diameter, of welded steel fabrication and coated with 4½ inches of insulation. Against the wall are vent lines for the safety valves on the turbine exhaust steam line which also required considerable welding during installation

VAUGHN MOTOBLOX

VAUGHN MOTOBLOC



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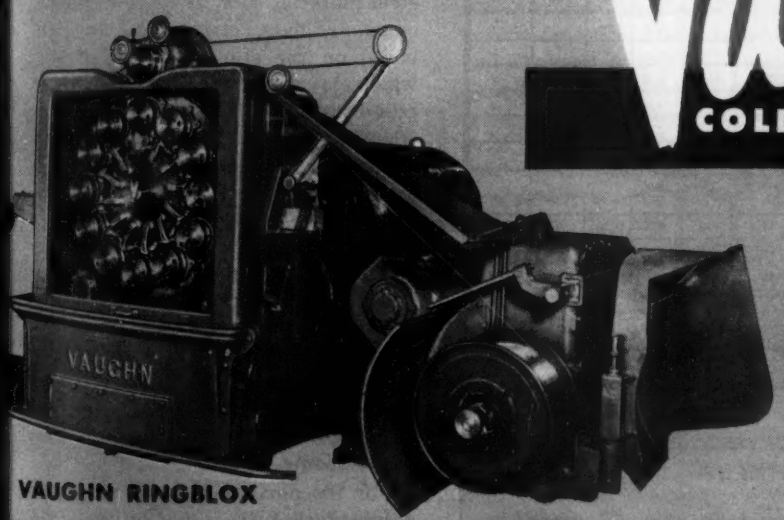

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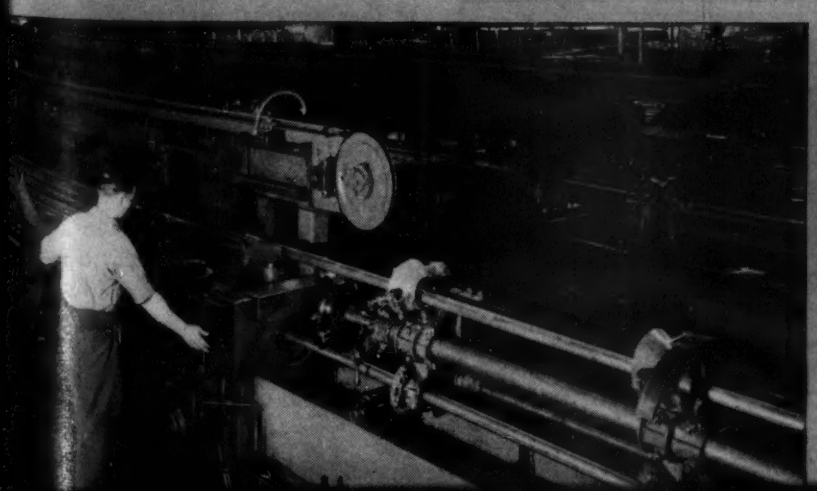

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STEEL ROLLING COSTS

Here's a Method of Reducing and Controlling Them

Setup enables foremen in all main departments of the finishing mill to know each day in terms of dollars and hours how their respective performances for the day line up against standards —and the trend for the current month

By DAVID R. CLEMENTS
Chief Accountant
Conners Steel Co.
Birmingham

THE first-line supervisor, the foreman, is the "man on the firing line." He is the representative of management closest to productive activity in the plant. And it is he who has the greatest influence over the control of production cost. He schedules the men, orders materials and supplies, requests services, and directs production. Consequently, the responsibilities of the accountant in aiding the first-line supervisor to reduce production cost are a matter of importance.

To obtain maximum benefits from cost control reports presented to the first-line supervisors, it is necessary to:

1. Furnish cost control reports as often as possible, preferably on a daily basis, so that corrective action can be taken as soon as it is apparent that such action is needed.
2. Present the information in operating rather than accounting terminology.
3. Exhibit only necessary and helpful information, avoiding concealing important information in a maze of figures.
4. Reflect both favorable and unfavorable results in such a way that the cause or individual responsible is clearly indicated, disclosing to the operator the weak points in each operation.
5. Make certain that all information contained in the cost control reports is accurate.

The particular controls outlined and illustrated in this article are designed for a plant producing finished steel material such as angles, beams, channels, flats, strip, etc., and are based on the standard cost system, which is more readily adapted to cost control than any other cost accounting procedures. Finished steel is produced in accordance with a schedule prepared by a centralized sales and order department. Analyses of the favorable or unfavorable cost variances resulting from size of orders and sequence of the rolling cycles are not dealt with here. They are furnished to the top management of the company rather than to the departmental foremen, since the latter do not have control over the rolling schedule.

For the purpose of this study it is assumed that the plant is made up of four principal departments: Steel yard, rolling mill, finishing department, and shipping department. The three primary groupings of controllable cost, for which reports must be devised, are: Crew quotas, performance and yield information, and miscellaneous (demurrage, materials, supplies, fuels, maintenance, etc.).

Crew Quota Control — Reports should be provided each departmental foreman on each turn exhibiting over and under standard use of labor by occupations for his assistance in

STEEL YARD DEPARTMENT
UNLOADING & STACKING
DAILY CONTROL

MONTH OF MAY, 1949 TURN 7 - 3

DATE	NO. 318 NAME JONES					NO. 332 NAME SMITH					NO. 324 NAME BROWN				
	CRANE HOURS			VALUE OF VAR.		CRANE HOURS			VALUE OF VAR.		CRANE HOURS			VALUE OF VAR.	
	BUD.	ACT.	VAR.	TODAY	TO DATE	BUD.	ACT.	VAR.	TODAY	TO DATE	BUD.	ACT.	VAR.	TODAY	TO DATE
1	7.3	8.0	.7	$ 8*	$ 8	8.1	8.0	.1	$ 1	$ 1	7.9	8.0	.1	$ 1	$ 1
2	6.8	8.0	1.2	14	22	8.5	8.0	.5	6	7	8.1	8.0	.1	1	-
3	7.1	8.0	.9	10	32	8.3	8.0	.3	3	10	8.3	8.0	.3	3	3
4	7.4	8.0	.6	7	39	8.0	8.0	-	-	10	7.4	8.0	.6	7	4
5	6.5	8.0	1.5	17	56	7.9	8.0	.1	1	9	7.7	8.0	.3	3	7
6															
28															
29	6.8	8.0	1.2	14	489	8.2	8.0	.2	2	67	7.9	8.0	.1	1	78
30	7.2	8.0	.8	9	478	7.9	8.0	.1	1	66	7.2	8.0	.8	9	87
31	7.7	8.0	.3	3	481	8.3	8.0	.3	3	69	7.6	8.0	.4	5	92

* *ITALICS* INDICATE UNFAVORABLE AMOUNTS

Fig. 1—Daily control exhibit for crews in the steel yard

ROLLING MILL DEPARTMENT
DAILY CONTROL

MONTH OF MAY 1949 TURN 7 - 3

DATE	NET TONS CHARGED	NET TONS FINISH	YIELD PERCENT	OPERATING ANALYSIS EXPRESSED IN MINUTES: ROLLING BUD.	ROLLING ACT.	ROLLING VAR.	ROLL CHANGES (TIME TAKEN) BUD.	ROLL CHANGES ACT.	ROLL CHANGES VAR.	PASS AND SIZE CHANGES BUD.	PASS AND SIZE CHANGES ACT.	PASS AND SIZE CHANGES VAR.	MISCELLANEOUS DELAYS BUD.	MISCELLANEOUS DELAYS ACT.	MISCELLANEOUS DELAYS VAR.	TURN SUMMARY ANALYSIS: BUD.	ACTUAL	VARIANCE TURN	VARIANCE VALUE	VALUE OF VARIANCE TO DATE
1	96.86	87.29	90.1	435	350	85	-	-	-	30	11	19	48	70	37*	1.07	1.00	.07	$ 31	$ 31
2	81.71	74.82	91.6	391	355	36	100	95	5	26	18	8	43	12	31	1.17	1.00	.17	75	106
3	99.20	90.49	91.2	392	375	17	73	70	3	40	30	10	83	5	38	1.14	1.00	.14	61	167
4	60.61	55.06	91.1	286	333	47	140	134	6	10	5	5	32	8	24	.97	1.00	-.03	13	154
5	27.90	22.01	78.9	176	216	40	140	191	51	31	28	3	19	39	20	.76	1.00	.24	100	54
6																				
7																				
29	70.88	64.73	91.3	361	338	23	33	40	7	31	60	29	60	42	2	.97	1.00	-.03	13	687
30	55.34	50.10	94.3	355	302	39*	51	60	9	20	28	8	30	0	30	.97	1.00	-.03	13	674
31	57.39	52.27	87.6	234	277	43	140	150	10	-	-	-	26	53	27	.83	1.00	.17	71	603

* *ITALICS* INDICATE UNFAVORABLE AMOUNTS

Fig. 2—Daily control exhibit for each turn foreman

controlling the number of employees working under his supervision. The basis for control here is the standard crew quota showing number of employees required in each department for all of the various conditions under which the department might operate. In order to be effective, crew quotas should be established on engineering principles and should be approved by the top level management of the company. These crew quota standards must be revised immediately in case of changes in operating practices or equipment.

Information exhibited in cost reports designed for the control of crew quotas is tabulated by comparing the hours worked on each occupation with the hours allowed for existing conditions in the approved standard crew quotas. Summarized reports of over and under standard uses of labor must be furnished to departmental and plant superintendents to maintain effective control over the use of labor. Also, it is beneficial to make it a requirement of operating procedures that the department or plant superintendent approve over-quota use of labor as shown on time abstracts, before hours worked are posted to the payroll. It is desirable to evaluate man-hours variance to furnish complete analysis of variances. It is possible to have over or under use of hours with no money variance due to admixture of wage rates.

Basis of Performance Reporting—In general, cost reports designed for the purpose of controlling performance, i. e., the use of time, should always isolate the performance variances by individuals responsible and, if possible, should also show contributing causes in full or partial explanation. In order to have adequate information available for the purposes of cost reports, it is necessary to have engineered time and yield standards for each department. These standards must be flexible enough for application to the varying conditions that may exist in the operations from day to day. It is essential to maintain such standards on a current basis if controls of individual or crew performances are to be of benefit to the first-line supervisor, i. e., errors in such standards should be corrected when they become apparent and the standards should be revised for changes and improvements in operating practice, etc.

Performance variation from standard is developed for report purposes in the following manner. Actual time operated is compared with earned time, which is obtained by multiplying the production, service rendered, etc., on a particular turn by the standard time allowed, to arrive at the time gained or lost due to performance. This variance is multiplied by the standard cost of the unit of time used to arrive at the dollar value of the variance.

SHIPPING DEPARTMENT ▽ DAILY CONTROL

MONTH OF MAY, 1949 TURN 7 - 3

DATE	SHIPMENTS										PROCESSING MATERIAL TO CUSTOMER BINS				
	GONDOLA CARS					BOX CARS									
	MAN HOURS			VALUE OF VARIANCE		MAN HOURS			VALUE OF VARIANCE		MAN HOURS			VALUE OF VARIANCE	
	BUD.	ACT.	VAR. *	TODAY	TO DATE	BUD.	ACT.	VAR.	TODAY	TO DATE	BUD.	ACT.	VAR.	TODAY	TO DATE
1	69.8	80.0	*10.2*	*$ 38*	*$ 38*	27.5	32.0	*4.5*	*$ 17*	*$ 17*	58.7	48.0	10.7	$ 39	$ 39
2	81.6	96.0	*14.4*	*53*	*91*	36.6	40.0	*3.4*	*13*	*30*	32.3	24.0	8.3	31	70
3	79.3	88.0	*8.7*	*32*	*123*	29.1	32.0	*2.9*	*11*	*41*	43.8	40.0	3.8	14	84
4	70.7	80.0	*9.3*	*34*	*157*	22.3	24.0	*1.7*	*6*	*47*	51.5	56.0	*4.5*	*17*	*67*
5	67.9	80.0	*12.1*	*45*	*202*	37.5	40.0	*2.5*	*9*	*56*	46.1	40.0	6.1	22	89
6															
29															
30	84.1	96.0	*11.9*	*44*	*206*	29.3	32.0	*2.7*	*10*	*172*	35.1	32.0	3.1	11	261
31	75.6	88.0	*12.4*	*46*	*552*	22.7	24.0	*1.3*	*5*	*177*	44.1	48.0	*3.9*	*14*	*247*

* *ITALICS* INDICATE UNFAVORABLE AMOUNTS

Fig. 3—Daily control exhibit for shipping department foreman

Steel Yard and Rolling Mill—Control must start with the arrival of the steel. Cars of billets and slabs enter the plant over a track scale. As the first labor operation, crews consisting of a crane operator and two hookers unload the semifinished steel from railroad cars and arrange it in stacks in the mill yard. The steel yard foreman receives a steel yard department—daily control, Fig. 1, each day for the purpose of measuring the efficiency of the employees engaged in unloading incoming material. He can readily see from this report, on the sample figures used, that the crew headed by crane operator Jones falls consistently below the performance this operation should attain. This stands out in variance and in comparison with the performance of the other two cranemen shown on the same report. Cost of other operations performed by employees in this department, such as loading steel to be charged into the reheating furnaces, etc., requires similar control if the cost of these particular operations bulks large enough to justify the maintenance of these reports.

Operations of the rolling mill department include the reheating furnaces, mill proper, hot bed, and shears. Semifinished material is weighed before being charged into the reheating furnaces and all finished products are weighed with the exception of material rolled in lengths beyond the physical limitations of weighing facilities. The weight of product beyond the capacity of these facilities is calculated on a theoretical basis.

Each turn foreman is furnished with Fig. 2, rolling mill department daily control, for the purpose of controlling the use of time on the mill during his turn. While unfavorable variances indicate, by themselves, the need for corrective action, it often will be necessary and beneficial to the foreman if additional analysis is furnished in the form of explanations. These explanations might show experience on previous rollings of the product involved or, in the case of mill delays, might consist of statistics disclosing delays by facility and cause. Such data might render practicable cost reduction through alteration of, or improvements in, present equipment and operating practice. Comparisons of standard yield and actual yield are made for each turn, by product. In the event unfavorable variances are reflected due to below standard yield in the mill, an analysis is included in the explanations.

Finishing and Shipping—Included in the finishing department are all of the various machines used in straightening and shearing product delivered from the mill. As a result of the type of facilities available and peculiarities of certain rolled steel products, it is necessary to send varying quantities of material to the finishing department for straightening in order to meet commercial tolerances even though the customer's orders do not specify machine straightening. The mill inspector makes the decision as to whether or

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not the particular product is to be routed to the finishing department or sent directly to the shipping department. In order to properly control this selection, the accountant prepares each turn from the mill production sheet (which shows the destination of each lift of finished product rolled) a report of material sent to straightening machines. This report discloses by section, size, and customer the quantity of material sent to the straightening machines which was ordered to standard commercial tolerances and affords the foreman of the finishing department the opportunity of inspecting the material. If, in his opinion, the material does not need straightening, he questions the decision made by the mill inspector and asks that the inspection department re-examine the product.

Daily Cost Control Report—In an effort to maintain the highest level of efficiency possible in the use of time while each machine is operating, a daily cost control report is presented to each finishing department foreman for each machine operated on his turn, as follows:

1. Machine number and name.
2. Budgeted machine hours, actual hours machine operated, and variance in machine hours.
3. Value of the machine hour variance for the turn and for the month to date.

This report takes the same form as that illustrated by Fig. 1 for the use of cranes in the steel yard. Again it may be noted that we are concerned first with daily variance in hours and then with the cumulative value of the variances as the month goes on.

Material received from the mill and the finishing department is processed by the shipping crews to customers' bins, i. e., material is properly identified, placed in customers' bins, and entered on an order assembly card record. As assembly cards indicate completion of the various customers' orders, the finished steel products are removed from the bins and loaded into railroad cars for delivery to customer. For the purpose of this study, we are assuming that all shipments are made by railroad and that all material is loaded into gondola or box cars. The shipping department—daily control, Fig. 3, is prepared for the shipping department foreman, and shows shipments separately for the two types of railroad cars, because of the significant cost differential resulting from the additional time required per net ton of product to load material into a box car as compared with a gondola car.

It is readily noted from the variances reflected by the sample figures on this report that corrective action is necessary. The variances are both heavy and fluctuating. Every effort should be made by the accountant to aid the shipping department foreman in correcting a condition of this sort by analyzing the current operating practices with those in effect at the time standard crew quotas and time allowances for shipping were installed. Analysis would probably indicate one or more of the following sets of circumstances:

1. Greater percentage of orders being loaded directly into car from mill than was the case when standards were established. The variance resulting from this condition, which could be caused by a change in type of customers' orders or improved product rolled in the mill, should be immediately corrected by a reduction in shipping personnel.

2. Change in packaging or loading instruction on customers' orders which require considerably more time in loading material for shipment. New time standards should be established if this condition exists so that the department supervisor will not be penalized. Revenue resulting from charging customers for special loading should be compared with the cost.

3. Inefficient operations in the shipping department. If this condition exists, special notice of the unfavorable variance should be reported to the plant superintendent in a plant-wide summary of unfavorable variances.

Control of Specific Cost Factors—It may sometimes be necessary, as in our case, to provide the first line supervisor with additional reports in an effort to control other elements of cost. The following are examples of these:

1. Demurrage. Each day the steel yard foreman is furnished with a report designed to make it possible for him to eliminate, as nearly as possible, all demurrage costs incurred in his department. This report, prepared from the railroad's check of the cars in the plant yard as of 7:00 a.m. each day, discloses the following:

a. Number of cars on hand.

b. Number of cars received the previous day.

c. Accrued "debits" and "credits"—month to date.

d. Cars on demurrage today, showing car numbers and cost of demurrage for each car.

e. Cars that will be on demurrage the following day unless unloaded and released to railroad.

2. Mill delays. Even though favorable variances might be reflected in the "miscellaneous delays" columns of the rolling mill daily control report, Fig. 2, it is important that a complete analysis be made of the delays incurred on each turn by specific facility and cause, since a cost reduction of approximately $1.00 a minute can be realized by elimination of any of these delays. An analysis for this purpose is made daily for each turn foreman by costing each delay reported by the mill delay clerks and classifying it according to its cause. In addition, a weekly listing is presented to the plant superintendent and the turn foreman exhibiting the loss in minutes and the cost of delays incurred during the week and month-to-date, detailed by the specific causes and pieces of equipment responsible. Further summary reports covering periods of three to six months should provide supplementary help in these connections.

3. Fuel cost. The cost of gas used in the reheating furnaces for bringing semifinished steel up to rolling temperatures is usually large enough to warrant a daily cost control report to the turn foreman. Since the heater on each turn controls the quantity of gas used, the report exhibits the

MONTHLY ANALYSIS OF VARIANCES CONTROLLABLE BY DEPARTMENTAL SUPERVISOR

MONTH OF MAY 19 49

COLUMN NO.		1	2	3	4	5	6	7	8	9	10	11
	DEPARTMENT	CAUSE OF VARIANCE										
		LABOR		PERFORMANCE								
		QUOTA	OVER TIME	ROLLING	ROLL & PASS CHANG	MISC DELAYS	ALL OTHER	YIELD	FUELS	REPAIR AND MAINT	ALL OTHER	TOTAL
A	ACCOUNTING	280									450	170
B	INSPECTION		21								76	55
C	SUPT'S OFFICE										170	170
D	MECHANICAL	98	59						37	123	255	243
E	ELECTRICAL		43							33	104	76
F	YARD										50	50
G	ROLL SHOP						63			304	87	431
H	STEEL YARD						439			537	234	732
I	ROLLING MILL	430		798	321	367		892	229	3012	386	2359
J	FINISHING	139					220			723	450	486
K	SHIPPING						482			380	793	895
L	TOTAL	739	123	798	321	367	1796	892	229	3804	442	4382

EXPLANATIONS:

A-1 $ 280 - REDUCTION OF PERSONNEL IN PAYROLL DIVISION THROUGH IMPROVED PROCEDURES. STANDARDS WILL BE REVISED EFFECTIVE JUNE 1, RECOGNIZING NEW CREW QUOTA.

A-10 $ 450 - PURCHASE OF ELECTRIC CALCULATING MACHINE FOR PAYROLL DIVISION $450

G-9 $ 304 - REPAIRING NO. 2 MESTA ROLL GRINDER $304.

H-6 $ 439 - PRIMARILY ATTRIBUTABLE TO THE LOSS IN PERFORMANCE OF $421 BY THE UNLOADING AND STACKING CREW HEADED BY "CRANE OPERATOR — JONES"

H-9 $ 537 - REPAIRS MADE TO CRANE NO. 1 DURING MONTH $573.

I-1 $ 430 - UNDER STANDARD QUOTA USE OF MILL LADDERS DURING MONTH.

I-3 $ 798 - UNFAVORABLE VARIANCE DUE TO LOSSES INCURRED ON THE 3-11 TURN $392 AND 11-7 TURN $363 RESULTING FROM ABOVE STANDARD TIME REQUIRED WHILE ROLLING.

I-7 $ 892 - ABOVE STANDARD YIELD DUE TO GOOD SHEARING PRACTICE IN TAKING FULL ADVANTAGE OF THE INCREASE IN RANDOM LENGTH AND MULTIPLE LENGTH ORDERS.

I-9 $3012 - REPAIRS MADE TO FOLLOWING EQUIPMENT: REHEATING FURNACES $2210, 600 H P MILL MOTOR ON NO. 2 STAND $716, AND MILL SHEARS $86

J-6 $ 220 - OF THIS UNFAVORABLE VARIANCE, $696 WAS REFLECTED IN THE STRAIGHTENING AND SHEARING OF ANGLES ON NOS. 8 AND 13 MACHINES AND WAS INCURRED PRINCIPALLY ON THE 11-7 TURN.

K-6 $ 482 - DURING MONTH A GREATER PERCENTAGE OF ORDERS WERE LOADED BY THE MILL CREW DIRECTLY INTO CARS FOR SHIPMENT THAN WAS THE PRACTICE WHEN STANDARDS WERE ESTABLISHED.

K-10 $ 793 - PURCHASE OF BLOCKING LUMBER $880

L-2 $ 183 - OVERTIME IN THE INSPECTION DEPARTMENT CAUSED BY ABSENTEEISM DUE TO SICKNESS, AND THE OVERTIME IN THE MECHANICAL AND ELECTRICAL DEPARTMENTS WAS DUE TO EMERGENCY REPAIRS MADE TO THE REHEATING FURNACES AND MILL SHEARS.

* *ITALICS* INDICATE UNFAVORABLE AMOUNTS

Fig. 4—Monthly analysis exhibit for plant superintendent and departmental foremen

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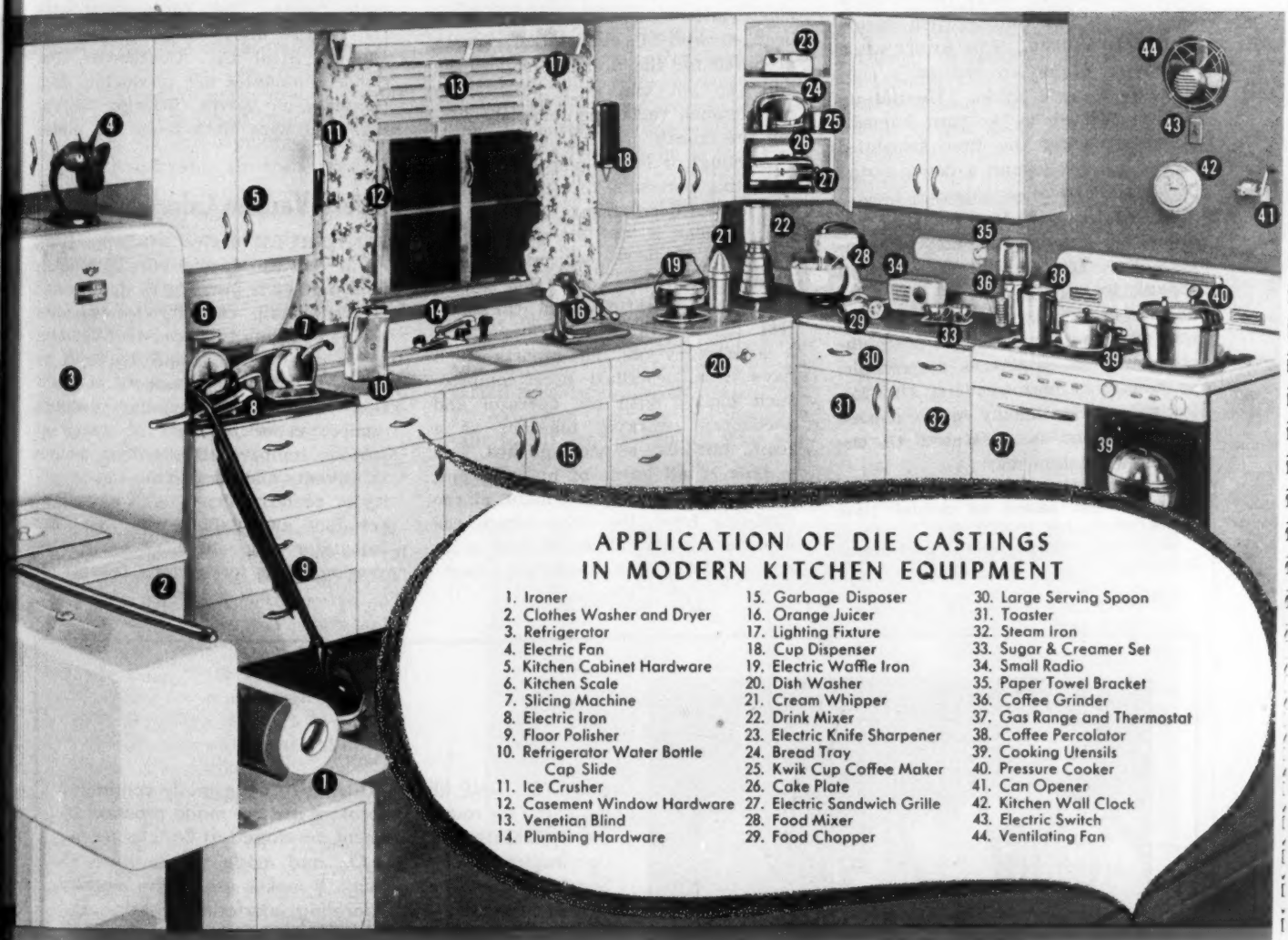

APPLICATION OF DIE CASTINGS IN MODERN KITCHEN EQUIPMENT

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3. Refrigerator
4. Electric Fan
5. Kitchen Cabinet Hardware
6. Kitchen Scale
7. Slicing Machine
8. Electric Iron
9. Floor Polisher
10. Refrigerator Water Bottle Cap Slide
11. Ice Crusher
12. Casement Window Hardware
13. Venetian Blind
14. Plumbing Hardware
15. Garbage Disposer
16. Orange Juicer
17. Lighting Fixture
18. Cup Dispenser
19. Electric Waffle Iron
20. Dish Washer
21. Cream Whipper
22. Drink Mixer
23. Electric Knife Sharpener
24. Bread Tray
25. Kwik Cup Coffee Maker
26. Cake Plate
27. Electric Sandwich Grille
28. Food Mixer
29. Food Chopper
30. Large Serving Spoon
31. Toaster
32. Steam Iron
33. Sugar & Creamer Set
34. Small Radio
35. Paper Towel Bracket
36. Coffee Grinder
37. Gas Range and Thermostat
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39. Cooking Utensils
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41. Can Opener
42. Kitchen Wall Clock
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following information by individual heaters:

a. Budget, actual, and variance in M. cu. ft. of gas used per net ton charged.

b. Value of variance to day.

c. Value of variance month to date.

Standards covering the use of fuel must set forth gas requirements for (1) heating while rolling (different standards must be established for heating the various sized billets and slabs), (2) heating while mill is down for the various delays, (3) holding turn, and (4) heating-up turn. Standards must recognize the differing lengths of time required for the last three items mentioned.

Holding turn is the period during which the mill is not operating but material to be processed is retained in the furnace at lower temperature to be ready for rolling when operations are resumed. This occurs when rolling schedules are not on a continuous 24-hour cycle. Heating-up turn is defined as the turn immediately preceding the first scheduled rolling turn following a down period of 16 to 24 hours or longer.

4. Repairs and Maintenance. In order that management may have information for correct decisions in regard to replacement of facilities and in order to insure proper control over the care and use of equipment by the employees responsible, a monthly report showing the following information by major classes of equipment is presented to the plant superintendent:

a. Budgeted repair and maintenance cost based on actual time operated during month.

b. Actual cost of repairs and maintenance.

c. Variances.

5. Materials and Supplies. A monthly report is prepared for the plant superintendent showing the quantity and value of each type of supplies purchased, broken down by individuals placing the orders. The accountant should be concerned primarily with the most expensive items. However, small cost items used in large quantities, such as paint brushes, flashlights, batteries, measuring tapes, small tools, electric switches, etc., should be watched.

A summary columnar analysis of controllable variances by principal causes, with a line for each department, Fig. 4, is prepared for the plant superintendent and the departmental foreman at the end of each month. All of the major variance classifications on this report have been covered in cost control reports prepared for the first-line supervisor daily to put him in a position to control such variances currently during the month.

Although it is the responsibility of operating personnel to control cost in the several departments, a better job can be done if the accountant does his part. It is the accountant's responsibility in this connection to furnish the operator with the control tools with which to perform a satisfactory job. The reports which have been described here comprise such tools. With the operator and accountant working together as a team, much can be accomplished. This is true at all levels of management, but it is perhaps most fruitful at the first-line level, the level where the greatest amount of direct cost is incurred. Daily and cumulative reporting of variances and supplementary reports issued at longer intervals have been found satisfactory in helping the first-line supervisor to reduce and control costs.

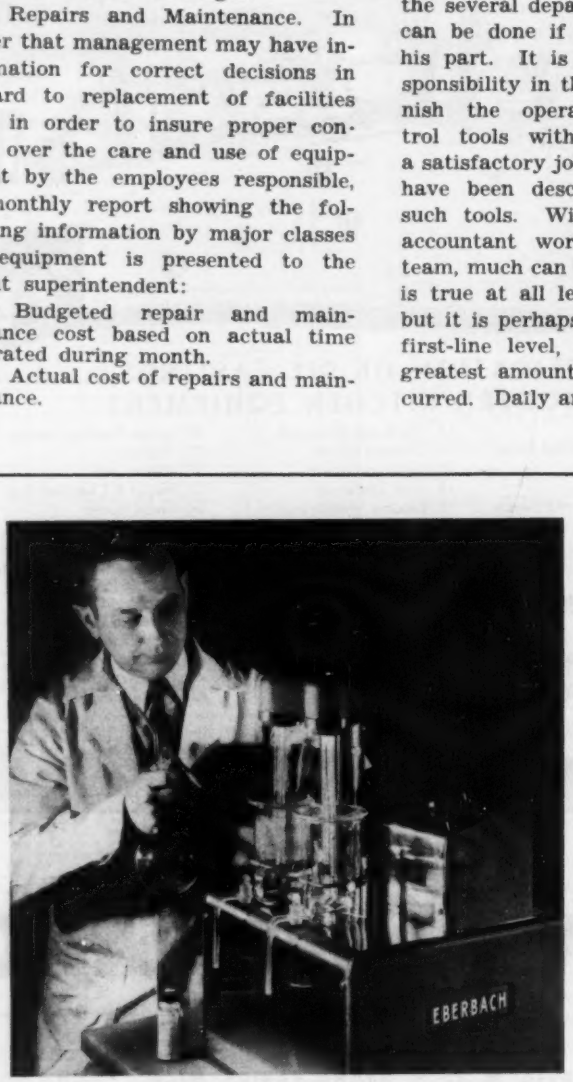
From a paper presented in the February *Bulletin*, National Association of Cost Accountants, New York.

Extends Equipment Life

A CORROSION-RESISTANT alloy said to increase service life of equipment from two to ten times is being used for such applications as pickling tanks, fume ducts, exhaust fan blades, pipe lines, acid circulating systems, etc. The material, stainless No. 20, made by Carpenter Steel Co., Union, N. J., is available in bar stock, wire, strip, tubing, pipe, sheet and plate forms. Clad form faced with the No. 20 alloy, is being made by Lukens Steel Co., Coatesville, Pa. Other companies are producing such products as valves, fittings, fastenings and wire cloth from the material.

Offers Vacuum Calculator

SLIDE-RULE device available from F. J. Stokes Machine Co., Philadelphia, makes it possible to determine: Needed pump capacity to evacuate a given volume to a specified vacuum in a given time; time required to evacuate a given volume to a specified vacuum with existing vacuum pumps; vapor pressure of water at various temperatures; boiling points of solvents under vacuum; and capacity of round tanks in both cubic feet per foot and gallons per foot. The calculator also includes basic conversion tables for vacuum operations.



ANALYSIS TIME REDUCED: Analyses previously considered too costly for routine laboratory use are made practical by the Dyna-Cath, an instrument developed at Battelle Memorial Institute, Columbus, O., and made by Eberbach & Sons Co., Ann Arbor, Mich. It makes use of the mercury cathode principle for separating interfering metals. Use may be for determining aluminum in steel and zinc-base alloys, zirconium in iron and steel, and uranium alkaline earths and alkali metals in alloys of iron, copper, nickel, chromium, zinc, molybdenum and other metals. The magnetic circuit causes rapid countercurrent stirring at the mercury-electrolyte interface, continuous cleaning of the mercury surface, and minimum re-solution metals deposited

Crane Deliveries

(*Concluded from Page 84*)

Under normal conditions, the cranes in the steel shed and bar storage building are busy with routine work. At such times there is little need for the steel shed supervisor to talk to the operators. But when he does want them, the need generally is urgent.

In the screw machine building are two rows of large automatic screw machines; each machine is equipped with its own stock rack. Unless the rack is kept filled, a machine must shut down. Principal responsibility of the shop foreman is to see that the machine operators do not allow their racks to become exhausted.

Contact With Crane Simplified — To keep these racks replenished with bars, either the operators or the foreman must contact the supply crane in sufficient time for the crane to make delivery. This job of making contact with the crane is simplified and expedited considerably through use of the trolleyphones.

In the bolt, nut and rivet manufacturing section of the plant, the trolleyphones are used for essentially the same purposes. Pickled and annealed coils of wire are brought out of the wire cleaning building by electric ram lift truck and are picked up by the 2-ton crane in the boltmaking bay of the manufacturing building. Job of this crane, shown in Fig. 3, is to distribute these coils to the boltmaking machines and to keep their stock spindles supplied.

This is a continuous job that requires close attention of the several shop foremen. The building is 480 feet long and it is not easy to contact the crane when it is half a building length away. The boltmaking machines are quite noisy and were trolleyphone communication not available it would be difficult to attract the crane operators' attention by shouting or signaling.

Several Floor Stations—To simplify making contact, the trolleyphone communication system installed in this building includes several floor stations so that the foremen can call the crane from any one of these points. This enables the foremen, who otherwise would spend considerable time running after the supply crane, to devote more time to overseeing manufacturing operations.

The second 2-ton crane in this building is used mostly to move partially finished material back and forth along the production line for trimming, pointing and threading operations. In most cases, this crane operator knows what he is to do, but once in a while he is required to perform some special material transfer. These instructions are communicated to him promptly by trolleyphone.

Two cranes are installed in the cleaning building. One large 15-ton unit handles the annealing furnace bells and wire coil spindles while the smaller 3-ton crane services the pickling tanks. Wire coils as received from the mill are stored in the steel shed and as needed are transferred to the cleaning building by electric ram lift truck. A trolleyphone floor station is located conveniently in this building so that both the pickling operation and the annealing operation can be carried on with a minimum amount of confusion, and without the costly mistakes that sometimes result from misunderstood instructions shouted from below.

Extension-Type Station — In the complete communication layout described in this article, there are four regular trolleyphone ground stations and one extension-type station. Extension units cannot be located on a moving machine because they must be connected to a regular trolleyphone by means of five wires. This can be done conveniently on floor stations, however, where all points under consideration are stationary.

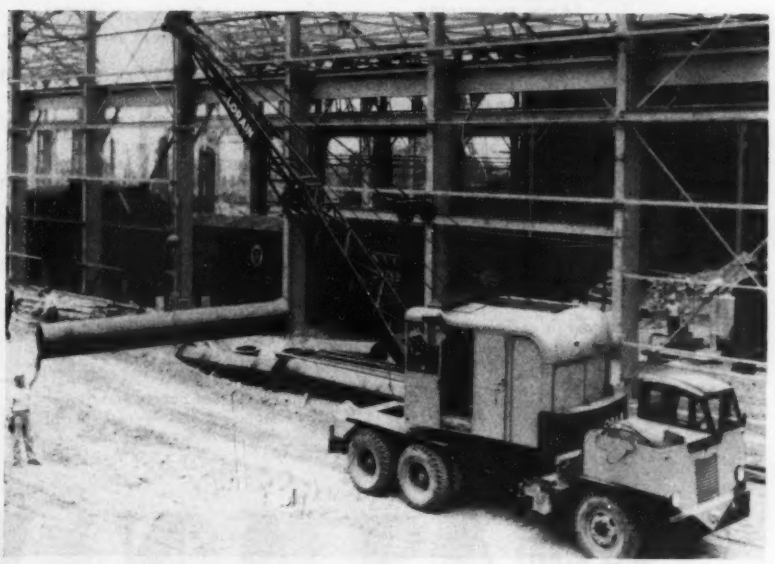
The extension unit is less expensive than the complete trolleyphone and each one includes a microphone, a loud speaker and a relay box. From an extension unit, a floorman can talk to all cranes and all floor stations, including any other extension unit installation.

This system provides instant and continuous contact between stations irrespective of whether the stations are fixed or moving. It is a common talking system. Each station is equipped with press-to-talk microphones and words spoken into any one microphone come out of all other speakers. Calling is done by simply speaking the name or number of the party wanted. An indefinite number of stations may be used on any installations and all units will hear regardless of position as long as they are in contact with power source.

Equipment is the same for stationary or moving positions. The trolleyphone consists of a transreceiver unit which is both transmitter and receiver, a resistor or transformer for lowering line voltage sufficiently to operate the tube heaters, a speaker and a microphone. Mounted in a heavy steel case, the equipment weighs about 80 pounds.

Current drain is about 1 amp and equipment is designed to operate with usual fluctuations in line voltage.

A special squelch circuit developed for the equipment keeps noise from coming out of any speaker until the receiver is engaged by someone operating a microphone button. This keeps the usual rasping and humming noises out of the speaker. Another feature is that noise, no matter how loud, cannot blast through at a level above that of the voice.



HELPS BUILD NEW MILL: Shown handling 24-inch pipe during the construction of a 30-inch hot strip mill for Alan Wood Steel Co., Conshohocken, Pa., is this Lorain Moto-Crane, built by Thew Shovel Co., Lorain, O. With the mill building completed, the on-and-off-the-highway crane is currently being used to the installation of mill equipment. The $9 million mill began operating early this year

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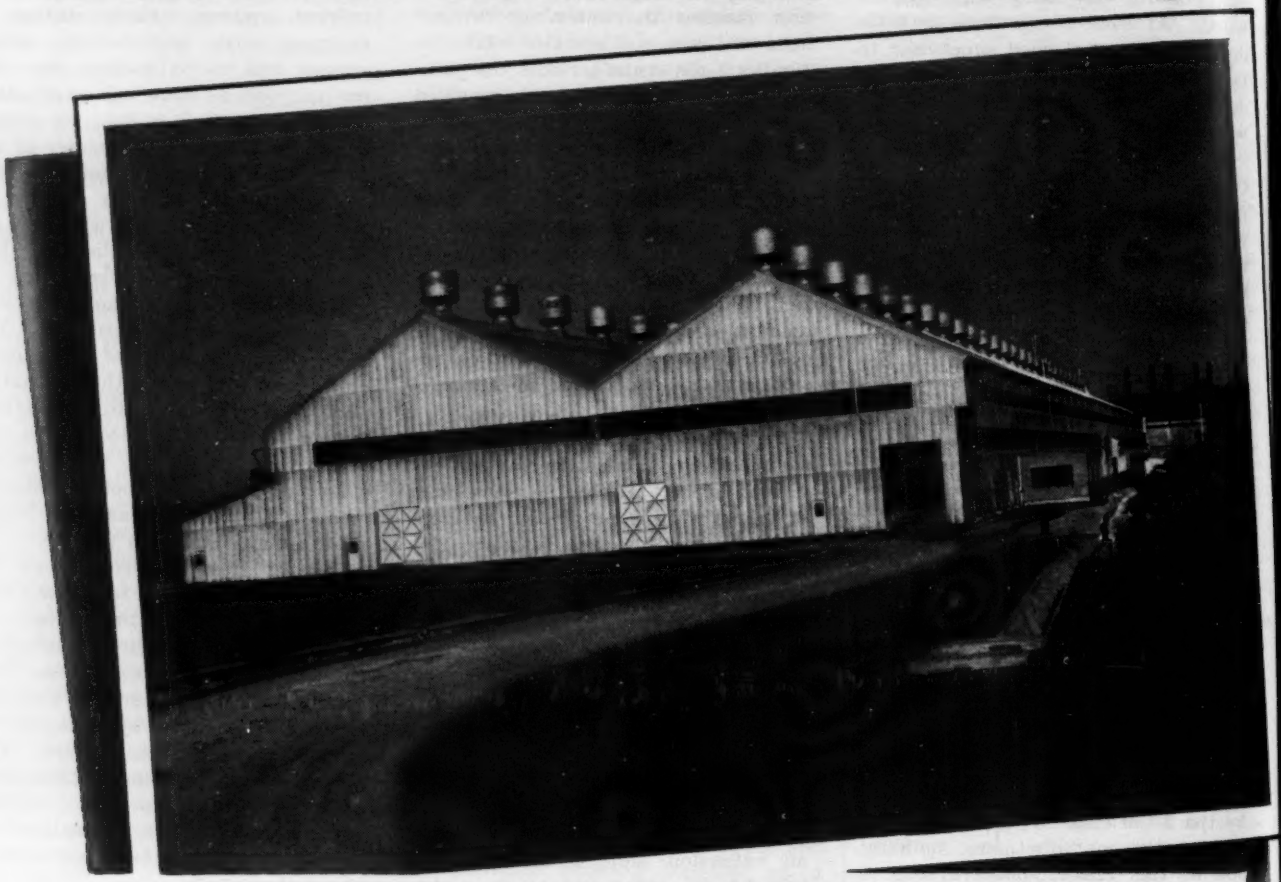

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NEW STRIP MILL

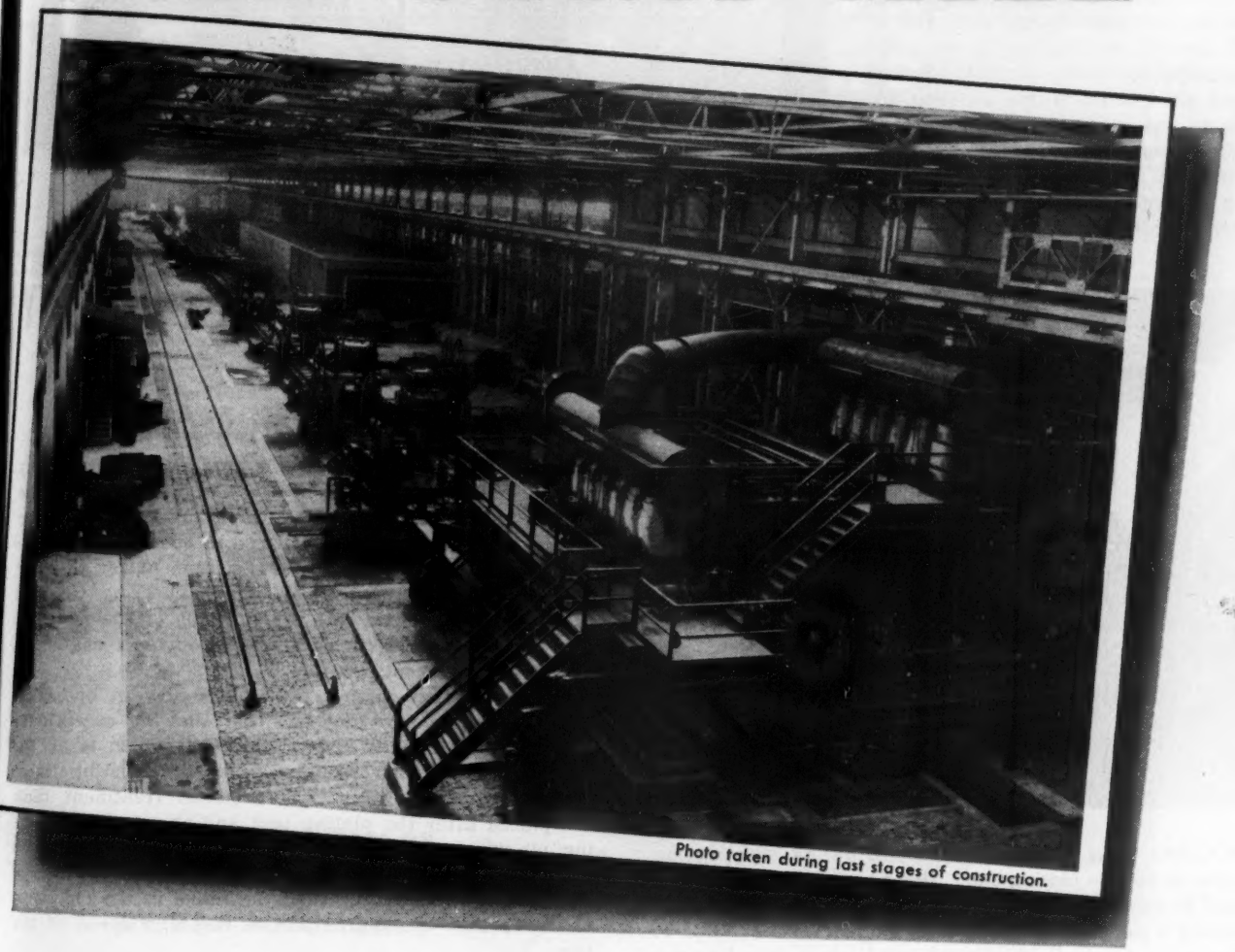

Photo taken during last stages of construction.

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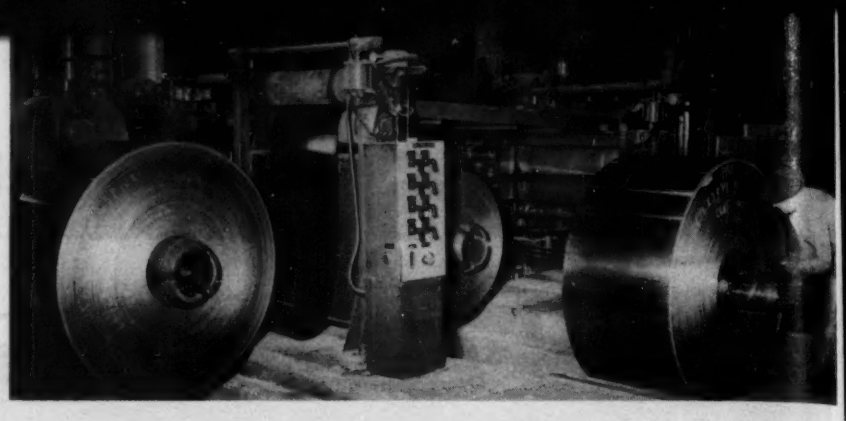
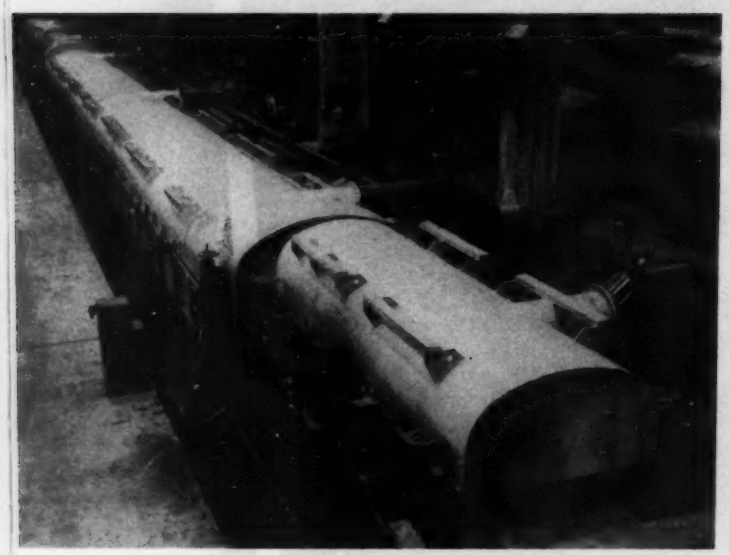


VIEW of entry end showing middle coil being unwound and fed into Weirton's new electrolytic tinning line. Another coil, mounted on reel behind, is awaiting its turn. Front end of this coil will be welded onto back end of coil already passing through line without stopping tinning process. Similar reels are located on the exit end, allowing the re-reeling of the coated strip without interruption to the coating operation. Strip emerging from looping pit enters cleaning tanks, passes between scrubber rolls and into . . .

NEW ELECTROLYTIC LINE BOOSTS NATION'S TIN PLATE CAPACITY



PICKLING tanks for the final process before entering the triple-decked tin plating unit. These tanks, the largest ever used in an electrolytic line, being 100 feet long and containing 8 per cent sulphuric acid solution held at 180° F, produce a bright finished steel band which is fed to the electro-cells of the . . .

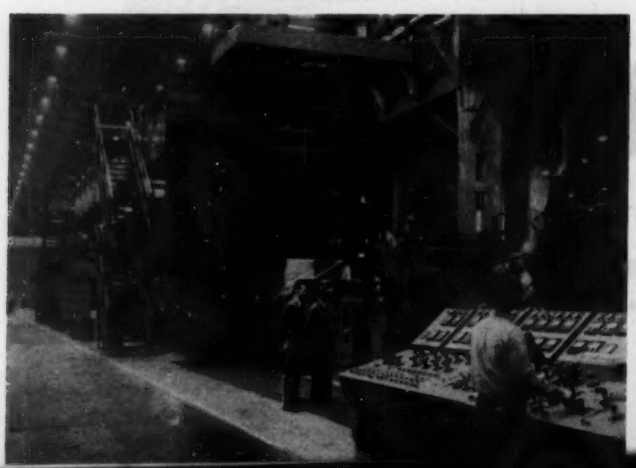
PLATING line which electrolytically coats moving strip steel at rate of 2500 fpm. Overall view shows triple-decked structure through which material moves from left to right. On lower deck, strip receives coating on its under surface, swings back on second deck to have its other side coated. On the third deck all electrolyte is thoroughly washed off. "Reflow" takes place as material descends from tower. When leaving plater, tin-coated strip has a dull matte finish. The "reflow" action electrically melts the tin and gives the strip a bright shiny surface, which is better able to stand handling. After a washing, rinsing and drying, material is coiled. If desired by customer, coils are sent to . . .

TIN PLATE capacity of the nation was increased by some 5 million base boxes by what is believed to be the largest and fastest electrolytic tinplating line of its type within the industry recently placed in operation at Weirton Steel Co., Weirton, W. Va. Equipment for the new line was manufactured by Wean Engineering Co. and Westinghouse Electric Co. All portions of the new line were produced to specifications of Weirton's engineers, who designed the entire setup.

Similar to the existing three lines now in operation at Weirton, the new unit has the following exceptions: It operates at speeds up to 2500 fpm, which is an increase of more than 1000 fpm over the existing lines; the "reflowing" unit and the chemical treatment tank are placed after the plating unit and ahead of the looping pit which is a reverse of position from that found on the three existing lines; it uses a pickling tank 100 feet long, 30 feet longer than the tanks in the old lines. Extra footage is required due to the high speed of the line.

Precise Power Control—As the line is designed to operate at such high speeds, it is necessary that the amount

SHEARING department where seven continuous flying shears cut tinplate to desired sheet sizes. These lines consist in general of a coil holder, a rotary shear for edge trimming, a flying shear for cutting predetermined lengths, and a series of conveyors which automatically sort the plate into various groups so that any defects, pinholes or improper gage which show up in the finished product will not find their way to the customer. From the classifier the sheets are counted and piled on an elevating piler and are then ready for packaging and final shipment



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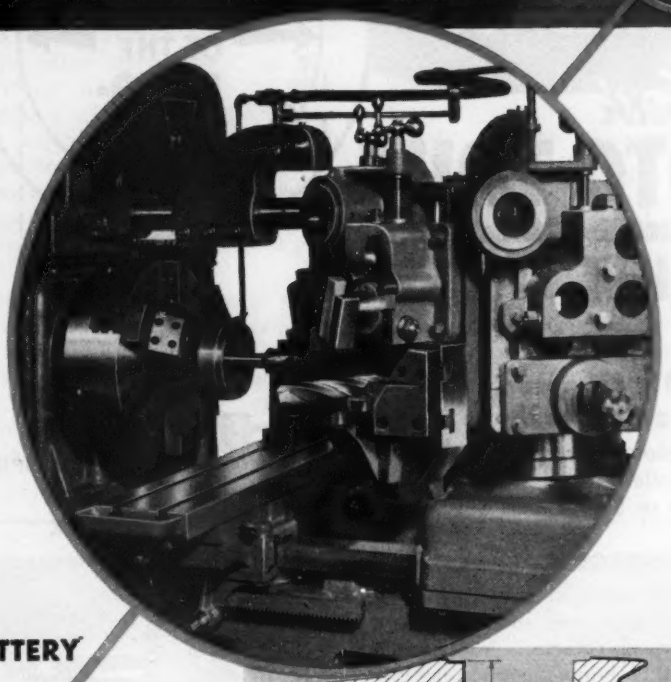
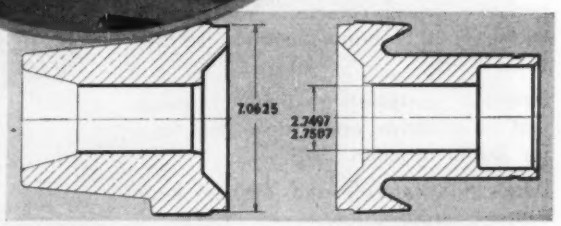
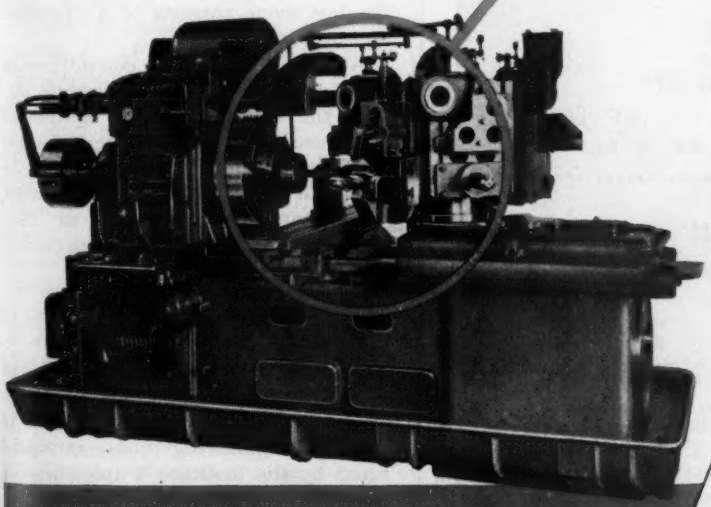
3. **REJECTS ARE HELD TO A MINIMUM, AND**
4. **LABOR COSTS CAN BE DIVIDED BY USING A BATTERY OF P&J AUTOMATICS**





1st OPERATION **2nd OPERATION**

Typical of profitable high speed, precision machining is this P&J Tooling setup on the P&J 5DELX Automatic for mass-producing forged steel commutator spiders. The surfaces machined in 2 operations are indicated by the heavy lines in the drawings. To determine the savings possible on *your* work, send samples to P&J for tooling recommendations and time estimates — based on the experience-proved combination of P&J Tooling on P&J Automatics.



P&J 50 YEARS' EXPERIENCE IN TOOLING FOR *Precision + Productivity + Economy*

POTTER & JOHNSTON CO.
PAWTUCKET, R. I.
subsidiary of PRATT & WHITNEY
Division Niles-Bement-Pond Company

P&J

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Handle Materials at Lower Cost

AND IN SMALLER SPACES, TOO --

with

MOTO-TRUC

MOTORIZED, BATTERY OPERATED

WALKIE TRUCKS

Up to 15" shorter, due to more compact drive unit.

With this Moto-Telescopic Hi-Lift Truck you can palletize and stack materials for as little as 8c per 8-hr. day.

CONTROL IS EASY

A turn of the wrist on easy grip roller type handle gives two speeds forward and two speeds reverse. Push buttons in the ends of handle control the hydraulic lift.

Patented articulating hinged spring unit holds drive wheel down on floor for better traction.

Dead man controls and 4-wheel load support insure safety.

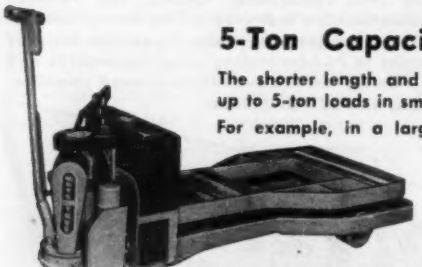
WRITE FOR LITERATURE

MOTO-TELESCOPIC HI-LIFT TRUCK

|← 33" →|

CAPACITY:

4,000 lbs., 80" lift.
2,000 lbs., up to 144" lift.



COMPACT POWER UNIT. Only 25" from front of truck to back of battery.

5-Ton Capacity, 18-Volt Platform Truck

The shorter length and capacity of this truck will enable you to handle up to 5-ton loads in smaller space.

For example, in a large cast iron pipe company it has enabled one man to handle loaded core racks in and out of oven where limited operating space and other truck equipment formerly required three men for the job. Besides, there is no core breakage.

All controls in handle. **Platform of truck is built to specifications for width and length of load.**

WRITE FOR LITERATURE

HI-LIFT, PLATFORM, CRANE AND PALLET TRUCKS

The MOTO-TRUC Co.
1953 E. 59th Street
CLEVELAND 3, OHIO.
ORIGINATORS OF MOTORIZED HAND TRUCKS

of power used in the reflowing operation be controlled in a precise manner. The power input must be regulated and the flow line held at a reasonably fixed point despite the fast-moving strip. In order to concentrate power at a particular point, in this particular case within 18 inches, Weirton and Westinghouse engineers resorted to the operation of eight radio tubes in parallel. These tubes concentrate 600 kw power in this narrow zone, the first time that such a concentration of high frequency has ever been made in the history of the radio or steel industry. In the reflowing operation the line utilizes 18,000 kw of power which is 36 times the wattage necessary to operate a 50,000 watt radio station. Electric current required to operate the new line is generated in its subfloor power plant.

Increased production afforded by operation of the new line, resulted in the addition of three new cutting lines in the shearing department. Two new lines, operating at speeds up to 100 fpm, and the converted black plate shearing line, brings Weirton's total number of cutting lines for electrolytic tin plate to seven.

Packaged Products Testing

NATIONAL Safe Transit Committee, Washington, D. C., has developed a procedure for testing packaged products of 100 to 1000 pounds as prepared for transportation. The test cycle as described in the procedure, designated as project 1, consists of a vibration and an impact test, conducted in that order. For packaged products weighing under 100 pounds, the test cycle consists of a vibration and drop test.

Available from the committee in printed form, the test procedure details the method of test, equipment to be used and the frequency of complete test cycles in both the 100 to 1000 and below 100 pound categories. The committee is located at 1010 Vermont Ave., N. W., Washington 5, D. C.

Pump Papers Published

VOLUME II of engineering papers of the Hydraulic Institute contains papers which were winners of awards in various engineering contests sponsored by the institute. Papers are on the following subjects: Cavitation in centrifugal pumps, the centrifugal pump in the process industries, operation of centrifugal boiler feed pumps, and submergence for centrifugal condensate pumps. Copies may be secured for $2.00 each from the institute, 90 West St., New York 6, N. Y.

Expands Creep Testing

B & W has 20 stations designed from creep tests in new lab; data of much value

MANUFACTURERS of steam generating equipment have found creep and stress-rupture data to be of considerable value, particularly in connection with rolled-in joints, superheater tubes, fittings, etc. Turbine builders find this information vital in the selection of alloys for turbine wheel forgings and lathes so that binding will not occur at operating temperatures and pressures. Knowledge of metal properties is important in the interest of safety as well as in determining service life.

One of the earliest attempts to investigate creep and stress rupture on an extensive scale was the establishment by Babcock & Wilcox Tube Co. of a joint fellowship at Massachusetts Institute of Technology in 1926. Recently the apparatus was moved to the company's new research development laboratory at Alliance, O. Twenty stations designed for creep tests, but usable for stress rupture tests are available.

Temperature Regulated—To achieve accuracy, multiple-circuit electronic controls have been applied; they are actuated by the expansion of the furnace to make it possible to hold temperatures within plus or minus 1° F up to 1550° F. A 10-inch test specimen is used, the precision of the extensometer being six parts in a million. A change of less than 10 micro-inches in the length of a test bar can be measured.

Because of possibility of expansion framework of testing unit, the room temperature is kept at a constant value. Additional facilities for creep and stress-rupture tests have been provided by the addition of 16 Baldwin - Southwark, single - station, lever-arm, creep-testing machines. A maximum temperature of 1800° F, with control holding the temperature to plus or minus 2°, is obtainable. The gage length of the test specimen is 3 inches and the accuracy of the reading is approximately 50 parts in a million. Temperature of each specimen is continuously recorded on a strip-chart temperature recorder.

Of Annular Design—For studying stress-rupture characteristics, four 12-station units have been built at the laboratory. Furnaces are of annular design and each contains 12 circular chambers for the specimens. Temperature of each is continuously recorded and when rupture occurs the change in temperature serves to record the time of rupture.

Excellent temperature uniformity is said to exist in these large furnaces, plus or minus 3° F up to 1500° F being regularly obtained. Each unit is usually operated at a different temperature level. Total capacity of the laboratory makes it possible to perform 36 creep tests and 48 stress-rupture tests, or 84 stress-rupture tests simultaneously.

Standard for Metal Powder

COVERING methods specifically for use by fabricators and users of structural parts made from metal powders is the first standard for the industry, compiled and released by Metal Powder Association, New York. Designated as standard 8-50T, tentative method for acceptance tests on structural parts made from metal powders, it describes procedures for testing a variety of pressed and sintered parts made from metal powders.

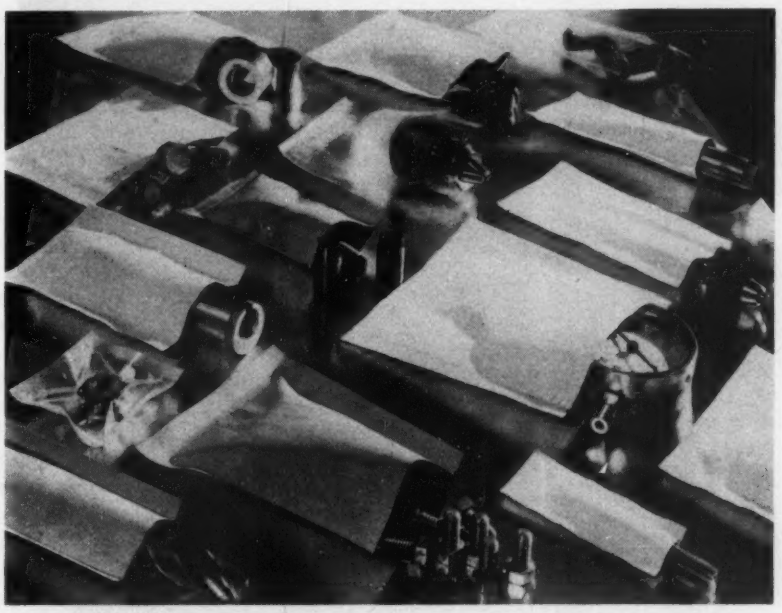
Details of test and range of values to be obtained are to be agreed upon by the producers and users of the part within the standard framework. Tests described include chemical composition, density for oil-impregnated and nonimpregnated parts, porosity, method of manufacture, dimensions and tolerances, mechanical properties, hardness, sample procedure and certificate of test. Standard is to remain tentative for 3 years, during which time suggestions for its approval will be welcomed by the association.

Figuring Coil Weight

EXACT weight of a coil of steel may be computed by a calculator available from F. J. Littell Machine Co., 4191 Ravenswood Ave., Chicago 13, Ill. Pounds per inch width of coil are found by setting the inside and outside coil diameters upon the calculator. Coil weight is computed by setting together the inch width weight and the stock width to get the total coil weight.

Now Makes Low Alloy Pipe

AFTER having been available as seamless pipe, sheets, plates and structural members for fifteen years, Yoloy steel now is being manufactured into continuous weld pipe by Youngstown Sheet & Tube Co., Youngstown, O. This nickel-copper low-alloy steel, is said to be easy



PROTECT YOUR PRODUCT IN PLASTIC: Machined surfaces, tools, subassemblies and delicate instruments may be protected against the ravishes of water, moisture, acids, solvents, grease, etc., with plastic-laminated bags, available in a wide range of sizes to meet your particular requirements. They can be made from polyethylene only, polyethylene laminated to foil, craft or cloth-backed foil. Bags remain flexible at temperatures as low as 40° below zero Centigrade, according to the manufacturer, Munson Bag Co., Cleveland. They are also nontoxic, will not support mold growth and are unaffected by ultraviolet light. A heat sealing process completes the barrier against the elements, leaving the packaged article safe inside

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to weld, bend and fabricate, besides having high tensile strength.

Additional advantages cited for the alloy steel in its new form are resistance to abrasion, shock and vibration and high corrosion resistance. With these characteristics, wide use of the continuous weld pipe is seen in railroad, oil mining and chemical process industry.

Research Gains Cited

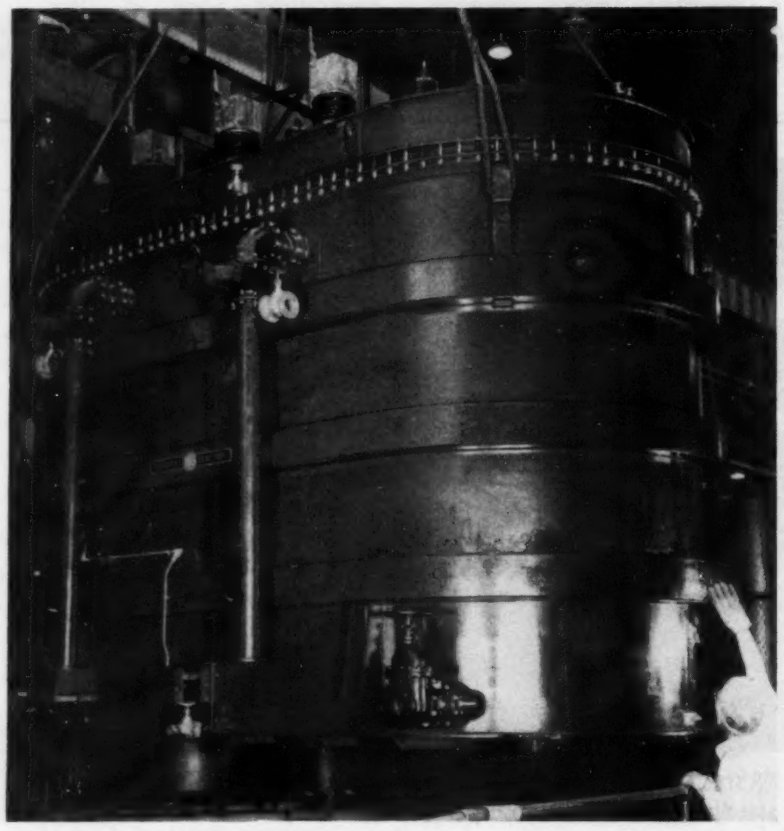
OVER $200,000 has been spent to date on intensive projects in the various fields of steel castings research, it was reported by Steel Founders' Society of America.

A group of representatives of principal steel foundries that are located in the Buffalo, N. Y.-Erie, Pa. industrial areas, meeting as members of technical and operating group No. 2 of the national society, estimates that potential saving of the research to the industry to be between $2 million and $8 million, depending on the extent to which research findings are actually applied to production and sales problems by individual foundries.

Weldability of carbon-manganese steels was the basis of a discussion, research having been carried out at Battelle Memorial Institute, Columbus, O. As detailed in the society's research report No. 16, it was shown conclusively that from the standpoint of weldability, cast steels are similar to wrought steels where compositions and heat treatments are of a similar nature.

Plant Maintenance Techniques

PROCEEDINGS of the first Plant Maintenance Conference, held concurrently with the Plant Maintenance Show in Cleveland in January, are available in a two-volume text, "Techniques of Plant Maintenance—1950". Available from Clapp & Poliak Inc., New York 17, N. Y., the two volumes comprise 278 pages and include 47 pages of tables, diagrams, illustrations, graphs and charts.



CURRENT STATISTICS: Input: 15,000 volts. Output: 135,000 volts. Weight: 150 tons. Rating: 145,000 kilovolt-amperes. Additional facts: Built by General Electric Co. at Pittsfield, Mass., this most powerful generator ever built by the company will handle enough power for a city of 150,000. Improved design is said to have made possible a 25 per cent reduction in size over comparable ratings in previous models. This is an important consideration as it is frequently difficult to ship such large equipment

LETTERS *to the Editors*

Reprints of Fundamentals

Your series on the "Fundamentals of Steelmaking" must certainly be good from the requests I get for it. You told me some time ago it would be published in book form in 1950 or 1951. The superintendent of our melt shop has seen the list of titles and would like to have the following:

One copy of: Electric Arc Furnace Steel; Scrap Iron and Steel; Production of Open Hearth Steel; Production of Tool Steel; Production of Bessemer Steel; Production of Metallurgical Coke and Resultant Coal Chemicals; Production of Butt and Lap Welded Pipe, Conduit and Electric Metallic Tubing. Two copies: Production of Pig Iron; Production of Seamless Steel Pipe and Tubes; Production of Stainless Steel.

Frederica M. Weitlauf
Technical Library
Timken Roller Bearing Co.
Canton, O.

These "Fundamentals" are on their way, being some of the over 37,000 sent out thus far. Should you be interested in any or all of the series, write Readers' Service Department, STEEL, 1213 W. Third St., Cleveland 13, O. —The Editors

Still Available

We are very much interested in securing ten copies of "Guide to Tool and Die Steels and Cemented Carbides". If any of these are still available, we would appreciate it if you would forward them to us at your earliest convenience, invoicing us accordingly.

O. E. Schwandt, Manager
Craine-Schrage Steel Division
Detroit Steel Corp.
Detroit, Mich.

Reprints of this guide, which originally was published in serial form in STEEL are still available at $1 each. Probably the most complete listing of its type available, it may be obtained through STEEL's Readers' Service Department, 1213 W. Third St., Cleveland 13, O.—The Editors

"We Want the Facts"

We wish to thank you for the copies of reprints of Steel Metalworking Facts and Figures from your Jan. 2, 1950, edition of STEEL magazine, pages 123-154 inclusive, received in response to our request.

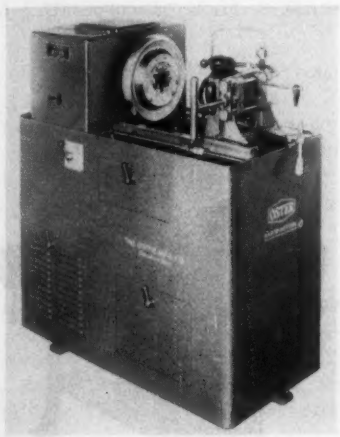
We have just received a call from our plant at Sanford, N. C., requesting two copies of this and would appreciate your sending us two more copies to cover our requirements.

C. S. Alden
Purchasing Department
Saco-Lowell Shops
Biddeford, Me.

New Products and Equipment

Floor-Type Threading Machine

Four 2-inch threading machines of the same basic design but with different types of die-heads and workholders comprise the Rapiduction Jr. line of floor-type threading machines, made by Oster Mfg. Co., Cleveland, O. Model Nos. 782 and 782-R are primarily pipe threaders with the same range of ¼ to 2 inches and a bolt range of ¼ to 1½ inches. Nos.



781-A and 782-A are primarily bolt threaders with the same standard bolt range of ¼ to 1½ inches, but with a pipe range of ¼ to 1¼ and ¼ to 2 inches, respectively.

No. 782 has two stationary dieheads and wrenchless chuck for threading straight pipe, conduit and bolts. No. 782-R has one manually operated revolving die-head and open-type vise for threading bent as well as straight pipe, conduit and bolts. 781-A and 782-A have an automatic revolving die-head and open-type vise for threading bent and straight bolts, rods, studs, pipe, conduit, etc. Single speeds are 25, 50, 100 and 200 rpm on all but No. 782-R, this one having 25 and 50 rpm speeds. All have 2 hp constant speed motors of 900 to 1800 rpm.

Check No. 1 on Reply Card for more Details

Grinders and Buffers

Larger pedestals which reduce vibration to a minimum feature the redesigned line of Economy grinders and buffers manufactured by Hisey-Wolf Machine Co., Cincinnati 8, O. Machines are offered in ¾, 1 and 2 hp bench models and ¾, 1 2, 3 and 5 hp pedestal models. The ¾ and 1 hp grinders have toggle switches, while larger machines have manual motor starters with overload protection.

Smallest machhines use an 8 x 1-inch wheel while the largest accommodates an 18 x 3-inch wheel. Motors are totally enclosed and shaft is mounted on two-shielded-type ball bearings arranged for grease lubrication. Tool rests are adjustable vertically and horizontally.

Check No. 2 on Reply Card for more Details

10 KW Induction Heater

Capable of supplying 10 kw (continuous) at 450,000 cycles per second is the type LI-10 induction heating unit announced by High Frequency Heating Division, Lindberg Engineering Co., 2444 W. Hubbard St,, Chicago 12, Ill. Single and two-station models are available with high and

low impedance terminals at each station. Input power is 230 or 460 v, 3-phase, 60 cycles. Tubes are operated under optimum conditions for maximum life.

All filament voltages are automatically regulated by constant voltage type transformers. The oscillator tube is air cooled and a make-up type, temperature controlled water system cools tank components and work coils. System features a water storage tank, built in centrifugal pump, and temperature operated valve. Other features are interlocks on all access doors, protective devices and complete timing control.

Check No. 3 on Reply Card for more Details

Speed Hole Grinding

Heald Machine Co., Worcester, Mass., is producing high-frequency wheel heads in a line covering the entire range of sizes and styles for internal grinding. They are offered in eight different models covering the range from 6000 to 100,000 rpm.

Two small sized heads have a combined range of 45,000 to 100,000 rpm and are arranged to take mounted point wheels. Higher speed heads are for high-speed small hole grinding beyond the practical limits of conventional belt driven heads and provide surface speeds which are high.

Check No. 4 on Reply Card for more Details

Deburrs At High Speed

Sheffield Corp., Dayton 1, O., is making available a high-speed precision burring and chamfering machine for production on various types of gears. Offered with either single or multiple stations, the model No. 380 will handle spur or helical gears, as well as multistart worms up to 7 inches in diameter. Operation is at a speed of 300 teeth per minute or intermittently when equipped with an automatic work cycle to stop the ma-

chine after each part has been completely burred.

Cutters are sharpened by grinding the face angle, thus reducing cutter sharpening costs considerably. One or both flanks of the tooth form, including the root, may be chamfered with each stroke of the cutter.

Check No. 5 on Reply Card for more Details

Spray Booth Cleans Air

Cleaning and maintenance requirements of the new spray booth for enamels, lacquer, paint and varnish, made by R. C. Mahon Co., Detroit, Mich., are reduced to a minimum by new principles of overspray control and disposal. A vertically fluted Hydraire flood sheet permits pas-

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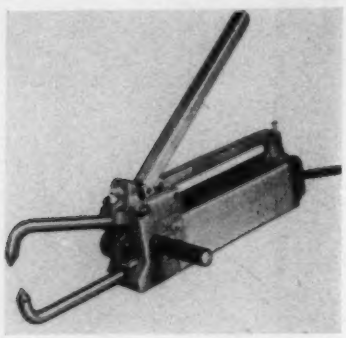
sage of air through the flutes and creates an even suction over its entire flooded area, producing an even flow of air throughout the working area of the booth. Eddying traps remove the bulk of the overspray. Remainder is removed by water at the rear of the flood sheet.

Particles of paint forming into a sludge on the surface of the charging tank move constantly, toward and over a weir into a jet eductor chamber, from which it is conveyed hydraulically to an automatic sludge segregator and unloader. This unit may be located in any convenient place in relation to the spray booth. It traps paint sludge and returns the water to the charging tank of the booth. Spray booth may also be furnished in the "downdraft" type, for floor conveyor systems with hydrofilter units below booth floor level.

Check No. 6 on Reply Card for more Details

Portable Spot Welder

Miller Electric Mfg. Co., Appleton, Wis., is producing a high efficiency, high output portable spot welder for 220 v lines only. Designated as model LMSW-52, it weighs 31 pounds. Unit is able to spot up to



two pieces of 13-gage stainless or mild steel, providing material fit-up is good (combined thickness of 3/16-inch) and two pieces of 16-gage galvanized.

Metal must be clean and free from paint or rust. Welder incorporates the multipressure tong lever which enables the user to get a good tight "spot" even where fit-up is poor on the lighter gages of metal.

Check No. 7 on Reply Card for more Details

Gas-Electric Power Units

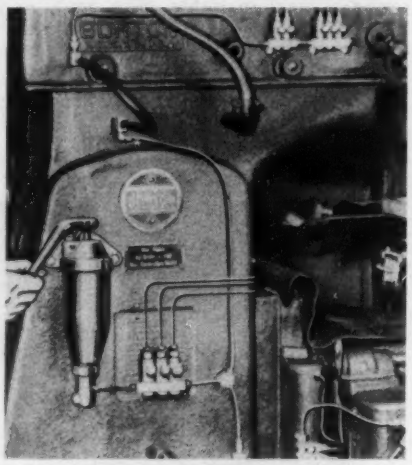
Tubular flange-type flexible Lord engine mountings and a flexible oil drain line are features of the new general purpose gas-electric power unit rated at 36, 48, 60 or 72 v, made by Ready-Power Co., Detroit, Mich. Power unit is for use with 4000 pound fork trucks, 10,000-pound platform truck and 6000-pound crane trucks.

Other features include an oiler for governor which permits cleaning without disassembly, oil filler and breather unit on cylinder head for accessibility and improved muffler design. Fan belt adjustment is accomplished by moving the 6 v battery charging generator. Separate fuel tank is fitted into a recessed area on outside of unit housing.

Check No. 8 on Reply Card for more Details

Replaces the Oil Can

Enabling the machine operator to apply the right oil and the right quantity at the right time to every machine bearing point is the CentrOiler system, developed by Lincoln Engineering Co., 5702 Natural Bridge



Ave., St. Louis 20, Mo. Time required for oiling is reduced to seconds and downtime for oiling or repairs is considerably reduced.

System consists of the pump supplying lubricant through a single line circuit of SL-4 injectors, which in turn deliver a predetermined, measured quantity of oil to each bearing every time the system is cycled. System offers a method of standardizing lubrication practices with standard lubricating equipment.

Check No. 9 on Reply Card for more Details

High Power Pump

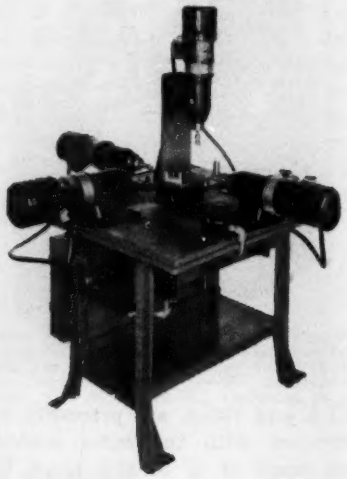
Alemite Division, Stewart-Warner Corp., Chicago, Ill., is producing the Versatal pump, powered by a locomotive type air motor operating the pumping piston in the lower cylinder. Mechanism draws in material at the bottom of the tube and discharges the product through a surge eliminator at the pump outlet and directly into the supply line. Uses may be for handling or spraying paint, applying glue, adhesives, protective coatings, or gear coatings, maintenance work or material handling.

Pumps have sufficient power to push most material from a central storage point to any floor in a plant. Savings are thus realized in floor area, material handling and reduced insurance. In insulation work the same pump may be used for painting, caulking, disinfecting, insulating, sealing and other uses.

Check No. 10 on Reply Card for more Details

Taps Two to Four Holes

In reality several separate units is a tapping machine announced by Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich. Incorporating four



standard model KT tapping units which may be positioned according to the parts being tapped, the machine may be used to perform tapping on four different parts, tapping two to four holes simultaneously in each part. Suitable for a great variety of parts, it performs operations which frequently require building of special machines for each individual part.

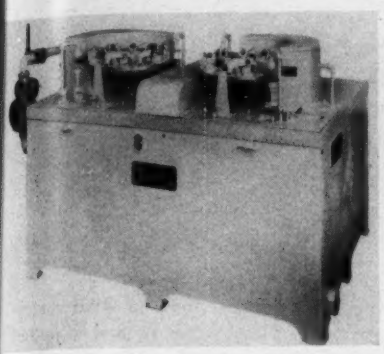
Check No. 11 on Reply Card for more Details

Fast Heating Machine

Chisels may be hardened and drawn in local sections of both ends at the rate of 60 per hour on an automatic gas-fired machine developed by Selas Corp. of America, Erie Ave. & D St., Philadelphia 34, Pa. Chisels are hand loaded on guides on two turntables and held in position by tension arms. Hydraulic indexing movement carries them through seven stations: Heating by two open burners, quenching and hardening by two oil streams, oil washed off by two water streams at two stations, drawing by two open burners, cooling, and loading.

After one chisel-end has been

treated in the cycle of the first turntable, it is then loaded on the second, moving in the opposite direction for similar treatment on the other end. Machine includes an oil-recirculator

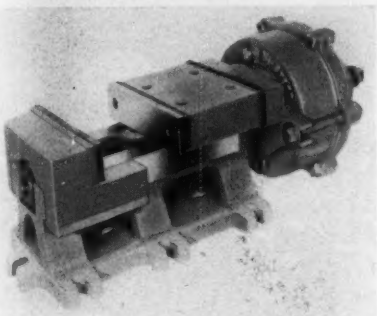


and heat exchanger. Oil wash water is returned to a separator tank for oil reclamation. Variable speed control provides for changes in heating time, if required for size change.

Check No. 12 on Reply Card for more Details

Air Operated Vise

Fast action and up to 4-inch stroke are features of the air-operated machine vise, made by Van Products Co., 2154 Baldwin Bldg., Erie, Pa. The model 811 Vi-Speed unit has from



0 to 5 tons pressure as needed, making it adaptable to almost any size work.

Width of jaw is 8⅜ inches and height is 2 inches. Maximum opening is 11 inches, preset by a standard hex wrench. Standard stroke is 1¼ inches and special stroke may be 4 inches. Pressure is 50 times the selected air pressure.

Check No. 13 on Reply Card for more Details

Records Machine Productivity

Production increases from 10 to 25 per cent frequently are shown after the installation of a Chronolog unit which produces a record of machine productivity and idle time and a count of work produced. The new model C-1 Chronolog, made by National Acme Co., Cleveland 8, Ohio, and offered by Chronolog Inc., De-

Uniform

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FLANGED, EXPANDED, TAPERED, DEPRESS BEADED, EXPAND BEADED, ROLLED, EXTERNAL UPSET, INTERNAL UPSET, SPUN CLOSED, FORGED, BEVEL FLANGED, FLATTENED, SWAGED, FLUTED.

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troit 26, Mich., shows when, how long and for what cause the idle time has occurred, all information being on a printed tape.

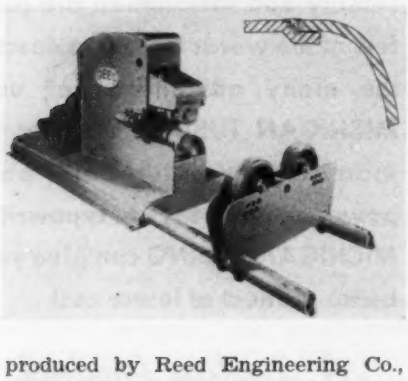
Of the seven columns of information presented in printed form, three may be changed to meet customer

requirements. Information derived is such that it may be used to check accuracy of time-study standards and methods. Data for hourly, piece work or other incentive payroll plans are available from the report. It accurately counts production, by time periods on each machine, and makes supervision easier for the foreman.

Check No. 14 on Reply Card for more Details

Offset Forming Machine

Circumferential seams on tanks and cylindrical shapes up to 7/16-inch thickness may be welded automatically without back-up bars or manual back-up welds, after making an offset joint on a forming machine



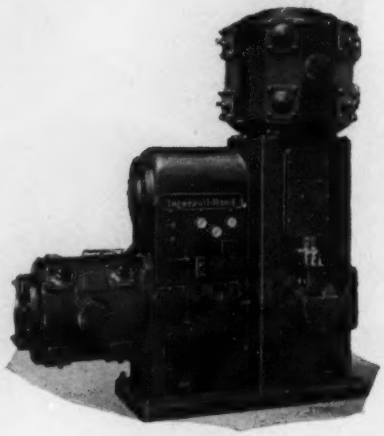
produced by Reed Engineering Co., 1003 W. Fairview Ave., Carthage, Mo. Machine produces an offset at the ends of the shell section over which the tank heads or other shell sections can be fitted for automatic welding. Offset portion becomes the back-up. In the offset process, the shell is made more nearly round and mill scale and rust are removed.

Model M-4 offset forming machine illustrated is equipped with hardened steel forming rolls. Hydraulic pressure is utilized for the offsetting pressure. The machine with standard forming rolls can handle material ranging from 3/16 to 7/16-inch in thickness. Minimum diameter which may be handled is 24 inches and the maximum depends upon the rigidity of the shell and material handling equipment available.

Check No. 15 on Reply Card for more Details

Full-Load Air Compressor

Sizes ranging from 125 to 350 hp for continuous full-load service in the line of packaged-type, heavy-duty electric-driven air compressors offered by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. This XLE line embodies a single vertical low-pressure compressor cylinder, a



horizontal high-pressure cylinder and a synchronous motor mounted directly on the crankshaft. Discharge pressures are from 80 to 125 psi.

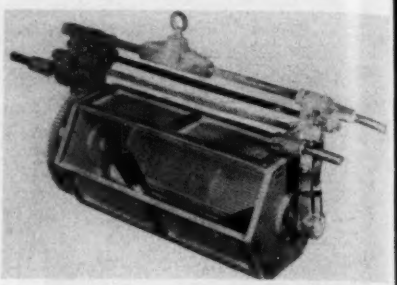
Air enters and leaves the compressor through main air connections on the frame, instead of on the cylinders, and is led to and from both cylinders and intercooler through large passages within the frame itself. Intercooler fits entirely within the same frame. All bearings are full-floating and rotate freely both on the bearing journal and within the rod or bearing housing.

Check No. 16 on Reply Card for more Details

Ribless Plating Cylinder

Hanson-Van Winkle-Munning Co., Matawan, N. J., is producing a Mercil type Merlon ribless barrel plating cylinder in 14 x 40-inch size for use with the commonly employed plating solutions. Ribless cylinder is in the hexagon shape, the body being made up of five covers. Merlon sheet stock is utilized for covers with a dovetailed slot milled along the edge of each cover.

Cylinder employs a flexible dangler, hair pin dangler or disk type contacts. Where flexible dangler contacts are used, heads are furnished with Merlon bushings and Merlon trunnions are used in the

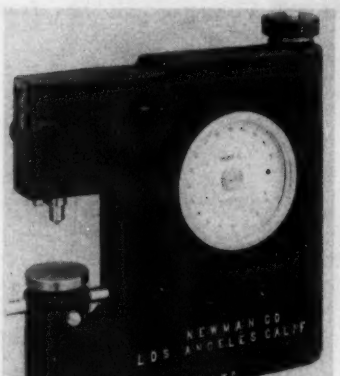


hangers. Steel trunnions with standard flanged type covers are supplied with hair pin dangler or contact.

Check No. 17 on Reply Card for more Details

Hardness Tester Is Portable

Usable in the accurate testing of steel and nonferrous metals and, with but slight adjustment for plastics, is the portable hardness tester offered by J. P. Newman Co., 3544 E. Fowler St., Los Angeles 33, Calif. Instrument is the Rockwell type of measurement, covering C, B and E



scales; all other scales are covered by a transposing chart.

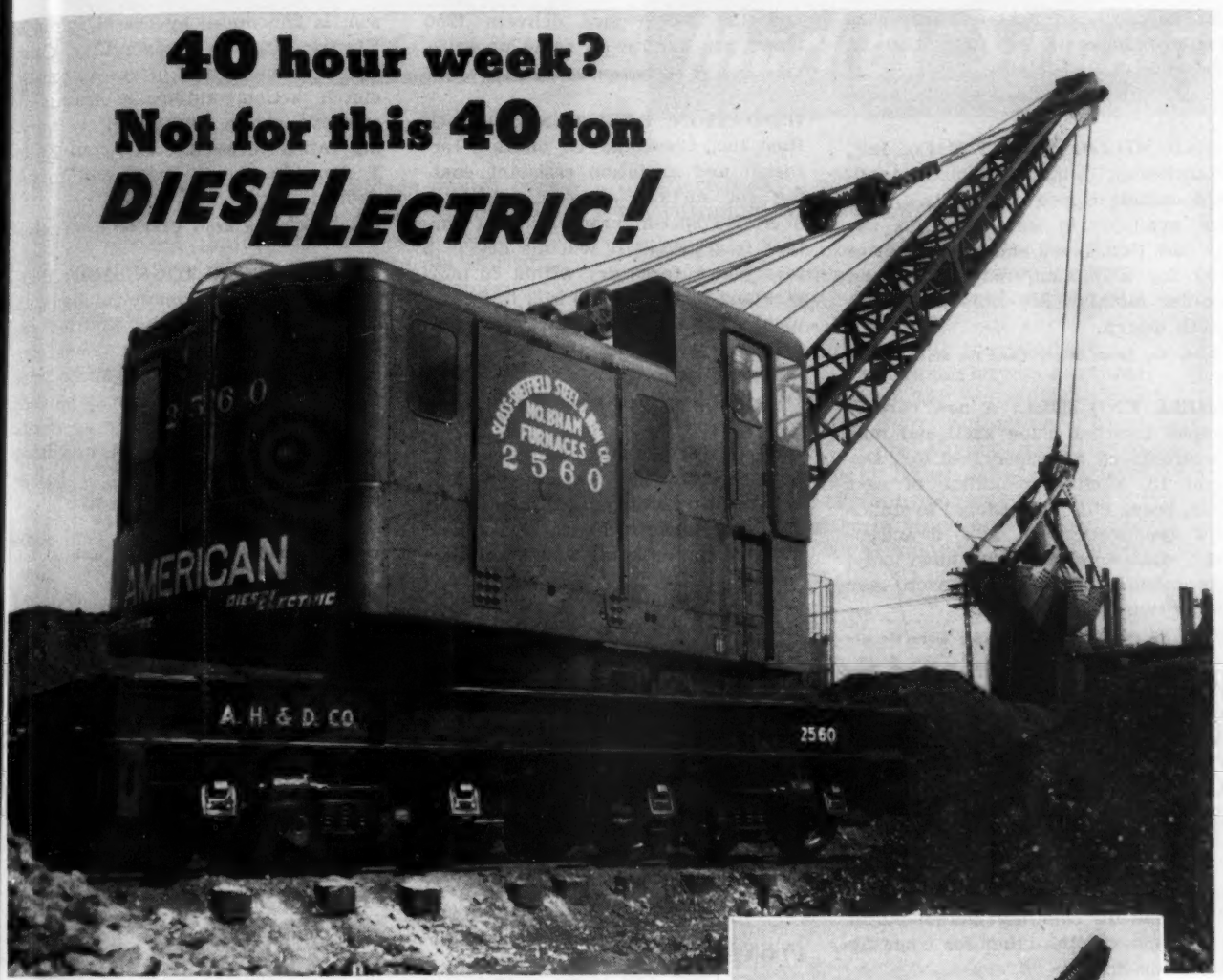
Throat opening is 1½ inches, suitable for 90 per cent of all shop and laboratory work. Overall size is 9 x 9 inches with a 3-inch base. Included with each instrument is one V-block and the three test blocks, plus the transposing chart.

Check No. 18 on Reply Card for more Details

• • •

REDUCES INSPECTION TIME: No. 11 thread gage, announced by Bryant Chucking Grinder Co., Springfield, Vt., uses the principle of interchangeable segments so that a wide range of internally or externally threaded parts can be checked on the same basic gage. Internally threaded parts

40 hour week? Not for this 40 ton DIESELECTRIC!



BUCKET, MAGNET, HOOK OR GRAPPLE . . . all operated with ease from AMERICAN's conveniently banked control panel. The DiesELectric Locomotive Crane is manufactured under Patent No. 2083460. Touch Control Patent No. 2370856.

Here's a crane that will work non-stop for 168 hours a week if you want—week after week after week. No coal stops, no boiler cleanouts, no water stops, no long and costly shutdowns for overhaul. It's the 40 ton AMERICAN DiesELectric!

SLOSS-SHEFFIELD STEEL & IRON CO. of Birmingham, Alabama, have one of these smooth working DiesELectrics doing a variety of jobs for them, handling ore, pig iron and scrap . . . and paying for itself by tremendous work output and a remarkable reduction of upkeep expense.

Maintenance savings of up to 50% are the result of patented DiesELectric design, using electric traction power to the trucks, diesel power to the crane deck. This design eliminates seven tons of wearing parts from the underbody, cutting down-time, labor and shop repair to a point where these savings will equal the entire cost of the crane in five years. Want to find out what a new AMERICAN DiesELectric could do for you? Mail the coupon below, for literature.

American Hoist
& DERRICK COMPANY
St. Paul 1, Minnesota

Plant No. 2: SO. KEARNY, N.J.
Sales Offices: NEW YORK • PITTSBURGH • CHICAGO

MAIL THIS COUPON FOR CATALOG

American Hoist & Derrick Company
St. Paul 1, Minnesota 5611

19 ● Please send information on DiesELectric Locomotive Crane, capacity_____tons.

Name_____

Company_____

Address_____

City_____ Zone___ State_____

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can be checked for fit and inspected for roundness in one operation at the rate of 0.07-minute.

Check No. 19 on Reply Card for more Details

SLAB MILLS: Nelco Tool Co. Inc., Manchester, Conn., announces standard carbide tipped slab mills. They are available in series 300 for use on cast iron, brass and bronze; series 400 for aluminum, magnesium and similar metals. All tools are spiral tooth design.

Check No. 20 on Reply Card for more Details

SHELL END MILL: A new carbide tipped inserted blade shell end mill is introduced by Super Tool Co., Detroit 13, Mich., for milling of cast iron, brass, etc. It is offered to standard specifications in 3, 4, 5 and 6-inch diameters, in right hand only, the number of blades in each case being twice the diameter.

Check No. 21 on Reply Card for more Details

TURN-COUNTING DIAL: Microdial, a new ten turn-counting dial, is announced by Gibbs Division, George W. Borg Corp., Delavan, Wis. Designed primarily for use with Micropot ten turn precision potentiometers, it is applicable to any multiturn device of ten turns or less. It is composed of two concentrically mounted dials, one for counting increments of each turn and the other for counting turns up to ten.

Check No. 22 on Reply Card for more Details

MEASURES TEMPERATURE: A new and amplified line of pressure and temperature recorders is available from Penn Industrial Instrument Corp., Philadelphia 32, Pa. Temperature measurement by the self-actuated tube systems of the gas-filled vapor tension and liquid-filled types for ranges from minus 100° F to plus 800° F are offered.

Check No. 23 on Reply Card for more Details

PLATFORM TRUCKS: Hallowell 700 steel platform trucks are introduced by Standard Pressed Steel Co., Jenkintown, Pa. Three general models available are light duty, medium duty and heavy duty.

Check No. 24 on Reply Card for more Details

AIR VIBRATORS: Cleveland Vibrator Co., Cleveland 13, O., announces type SAH pneumatic vibrator assembly which incorporates an alloy steel stud which facilitates easy insertion into the sleeve type mounting bracket that is welded to the assembly requiring vibration. They are available in two sizes, the 1¼-inch size delivers about 2500 vibrations per minute on 100-pound line pressure and the 2-inch size delivers 1250 blows per minute on same pressure.

Check No. 25 on Reply Card for more Details

OXIDATION RESISTANT: End-O-Rust Inc., Cleveland, O., offers a corrosion and oxidation resistant coating for metals, concrete, wood or fiber. No special preparation of surface is required. It will air dry in 2 to 3 hours, force dry within 30 minutes and infrared bake in 3 to 5 minutes. Coating has a high hard gloss finish, impervious to abrasion, weathering and hard wear.

Check No. 26 on Reply Card for more Details

GAS-TIGHT DOOR: Jamison Cold Storage Door Co., Hagerstown, Md., is marketing an insulated door with a gas-tight, vapor-tight seal. It is useful in finishing, cleaning and other processing industries where operations using or generating gases, vapors, steam and smoke necessitate a durable seal.

Check No. 27 on Reply Card for more Details

FOR RUSTED METAL: Designated as Tuf-On-Rust, a new anticorrosive primer for corroded iron and steel is announced by Brooklyn Varnish Mfg. Co. Inc., Brooklyn, N. Y. It can be applied by brush or spray and dries in about 4 hours for recoating.

Check No. 28 on Reply Card for more Details

FLOATING HOLDER: Misalignment between tool and work is instantly corrected when using the new JA floating holder, developed by Scully-Jones & Co., Chicago 8, Ill. Cutting tools align themselves and enter holes without "cramping" or bending. Equal freedom of float in all directions, even under heavy loads, is provided by the drive coupling and two standard ball thrust bearings.

Check No. 29 on Reply Card for more Details

END MILL: Known as Postiv-Lok, a new type of end mill that eliminates the need for integral tapered shank end mills on large boring mill jobs, profiling and similar applications, is announced by Putnam Tool Co., Detroit 7, Mich. It is available in sizes ranging upward from 1½-inch diameter.

Check No. 30 on Reply Card for more Details

MOTOR STARTERS: Electric Controller & Mfg. Co., Cleveland 4, O., announces new 2300-4600 v motor starters for class I, group D hazardous locations. It is of the combination type with oil disconnect switch and provides short circuit protection.

Check No. 31 on Reply Card for more Details

AUTOMATIC TRANSMISSION: A new variable speed V-belt transmission is annonuced by Diesel Pump & Electric Mfg. Co., Culver City, Calif. The Maximatic unit offers automatic clutch action, automatic torque-responsive action and infinitely varying ratios between 4 to 1 and 1.6 to 1, depending upon speed and torque applied.

Check No. 32 on Reply Card for more Details

FASTENS RODS TOGETHER: Made of high alloy aluminum tubing with a machined thread and knurled exterior, a new lightweight connecting screw joint is offered by Minit-Joint Co., South Bend, Ind. It may be used for fastening together any segments of rods, wooden and metal, or tubing and can be used on solid or hollow stock. It is available in five stock sizes.

Check No. 33 on Reply Card for more Details

COLLECTOR RING: For slow speed operation to carry current up to 75 amp at 220 v, a new collector ring has been developed by Industrial Electrical Works, Omaha, Neb. It is provided with one, two, three or four conductors. Each conductor is precision machined and all parts are interchangeable.

Check No. 34 on Reply Card for more Details

CHANNEL STRIP: To provide permanent fasteners for applications subject to repeated "on-off" usage, a new gang channel nut strip is introduced by Elastic Stop Nut Corp. of America, Union, N. J. It provides additional strength for unusual assemblies in such applications as access covers and panels where misalignment of subassembly components can result in twisted channel strips, or nuts pushed out.

Check No. 35 on Reply Card for more Details

PROTECTS PUMPS: To prevent damage to pumps that is caused by their running without discharging water, Automatic Control Co., St. Paul, Minn., offers a new control, the Protectrol. It automatically stops the pump and keeps it from starting until manually reset. Emergency condition causes unit to energize audible alarm circuit and light warning signal.

Check No. 36 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL producers' order backlogs mount even though production is at a record pace. Demand for all major products, and even such heavy items as plates and structurals, is rising. With demand outrunning production shipments are becoming increasingly extended. Strike of firemen on four major railroads and resulting traffic difficulties added to shipping problems. Further deferments may be necessary. Much depends on length of the rail tieup and steelmakers' success in utilizing unaffected carriers, trucks and water transport. In any case, it is certain the mills will be busy most of the summer clearing away tonnage arrearages from second quarter.

PRODUCTION— April ingot output, 8,196,050 tons, was the largest ever recorded for that month. Barring curtailments which may be forced by the railroad strike, indications point to highest quarterly steel output on record, even topping the 24,100,000-ton peak achieved in the first three months of 1949. The rail strike is not likely to affect steel operations unless it is protracted. Metal consuming industries, however, were hit immediately. Some plants were forced to curtail the first day of the tieup. Shifting of freight to unaffected roads and trucks cushioned the blow, but inadequacy of loading and truck facilities precludes substantial relief from this direction should the strike be prolonged. Traffic conditions vary from district to district depending upon rail services at the different centers, but a prolonged strike is believed certain to slow down manufacturing generally. Shortage of freight cars, hundreds of which are tied up on struck roads, alone is bound to seriously hamper shipments generally.

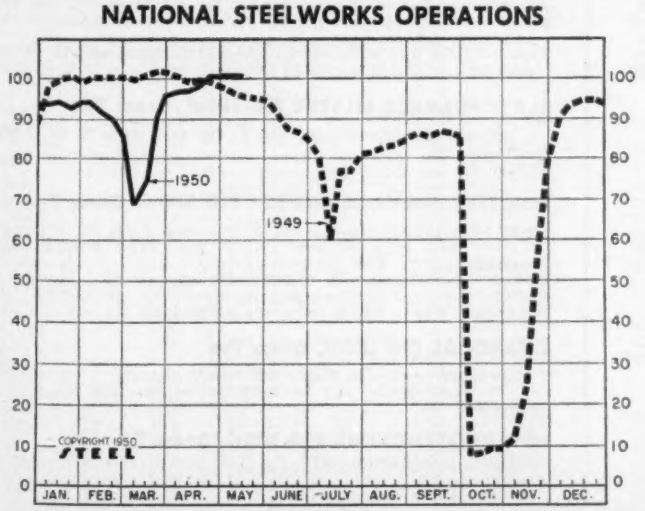
OPERATIONS— Steelmaking held at 100.5 per cent last week, fourth consecutive week at full capacity or better. How long full operations can be maintained in the face of shipping difficulties is uncertain. Some plants may not be affected at all while others may have to begin curtailing winthin a week or so.

DEMAND— Pressure on the mills shows no signs of early abatement. Consumers are specifying actively against orders and are seeking to place additional tonnage. In sheets and strip, supply conditions rival the shortage experienced two years ago. Some buyers are turning to the conversion market for relief. Gray market offerings are more numerous. Most fabricators, however, are shying away from premium-priced metal. Sheet deliveries extend 8 to 12 weeks and current bookings will take up most of third quarter production. Carbon bar orders extend through August on small sizes.

PRICES— Minor adjustments in finished steel prices by individual producers are noted but, in the main, the market holds at levels established early this year. Two U. S. Steel subsidiaries and Wheeling Steel Corp. last week reduced special coated manufacturing ternes $3 per ton. Superior Steel Corp. announced increases on certain clad steels. A producer of tight cooperage hoop cut base prices $4 per ton but raised extras $9. Conversion ingot is selling at $70 to $75 per ton and gray market offerings of sheets above the standard warehouse market are appearing with increasing frequency. Foreign offerings at prices under domestic levels are reported heavier. German iron is coming in on the West Coast $7 per ton under the domestic market. Pig iron was advanced $2 per ton in Canada.

COMPOSITES— Scrap prices have advanced every week since Mar. 1. STEEL's composite on steelmaking grades now stands at $31.67 compared with $30.92 the preceding week and $23.25 a year ago. The weighted index on finished steel holds at 156.13 as does the arithmetical composite at $93.23. Pig iron price composities are steady with No. 2 foundry, $46.47, basic, $45.97, and malleable, $47.27.

NATIONAL STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended May 13	Change	Same Week 1949	Same Week 1948
Pittsburgh	99.5	— 1*	95	95
Chicago	104	— 1	99.5	93.5
Eastern Pa.	97	0	92.5	88
Youngstown	107	0	105	103
Wheeling	104	+ 1.5	90	97.5
Cleveland	97.5	+ 1.5	100.5	96
Buffalo	104	0	97.5	93
Birmingham	100	0	100	100
New England	87	— 1	66	78
Cincinnati	106	+ 3	101	104
St. Louis	80	— 2	75.5	78
Detroit	102	0	69	100
Western	95.5	+ 1.5	93	..
Estimated national rate	100.5	0	95.5	94.5

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.

*Change from revised rate.

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Composite Market Averages

	May 11 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	152.90	101.10
Index in cents per lb....	4.230	4.230	4.230	4.142	2.739
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$93.23	$93.23	$93.18	$93.55	$57.55
No. 2 Fdry. Pig Iron, GT	46.47	46.47	46.47	46.07	24.67
Basic Pig Iron, GT	45.97	45.97	45.97	45.60	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.27	25.29
Steelmaking Scrap, GT..	31.67	30.92	29.08	23.25	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	May 11 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.45	3.45	3.45	3.35	2.15
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.15
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95-4.00	2.65
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.20
Plates, Chicago	3.50	3.50	3.50	3.40	2.20
Plates, Coatesville, Pa. ..	3.60	3.60	3.60	3.50	2.20
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.20
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.65	2.20
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago ...	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.65
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25–30	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh ...	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–50	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.60
Nails, Wire, Pittsburgh...	5.30	5.30	5.30	5.15	2.80
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts. (NT)	$63.00	$63.00	$63.00	$61.00	$40.00
Sheet bar, mill (NT)	57.00–58.00	57.00–58.00	57.00–58.00	67.00	34.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts...	3.85	3.85	3.85	3.775	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	49.39	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	49.89	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	39.38	21.38
No. 2 Fdry. (Birm.)del.Cin.	49.08	49.08	49.08	45.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt, Pitts...	$36.00	$35.00	$32.25	$23.00	$20.00
No. 1 Heavy Melt, E. Pa..	28.50	27.25	26.00	22.75	18.75
No. 1 Heavy Melt, Chicago	30.50	30.50	29.00	21.00	18.75
No. 1 Heavy Melt, Valley..	35.25	33.75	32.75	22.00	20.00
No. 1 Heavy Melt, Cleve. .	31.75	31.25	29.25	18.50	19.50
No. 1 Heavy Melt, Buffalo.	29.75	29.75	29.75	23.25	19.25
Rails, Rerolling, Chicago..	48.50	47.50	46.50	27.75	22.25
No. 1 Cast, Chicago	42.50	42.50	41.00	27.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$14.25	$7.00
Beehive, Fdry., Connlsvl...	16.00	16.00	16.00	16.75	7.75
Oven Fdry., Chicago	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	19.50	19.50	18.50	18.00	12.00
Zinc, E. St. Louis	12.00	11.50	10.50	12.00	8.25
Lead, St. Louis	11.80	11.05	10.30	14.325	6.35
Tin, New York	77.75	77.00	76.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark, del.	50.63	51.13	51.63	52.13
Brooklyn, N.Y., del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward, Ala. W15	41.88	42.38	....	....
Cincinnati, del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda, N.Y., W12	46.00	46.50	47.00	....
N. Tonawanda, N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester, N.Y., del.	48.63	49.13	49.63	....
Syracuse, N.Y., del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	....	46.50	....
IndianaHarbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14 Y1	46.00	46.50	46.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	....	50.50	51.00	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
LosAngeles, SanFrancisco, del. ...	53.70	54.20	....	....
GraniteCity, Ill. M10	47.90	48.40	48.90	....
St. Louis, del. (incl. tax)	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland, Pa. P8	46.00	46.50	46.50	47.00
Pitts, N.&S. sides, Ambridge, Aliquippa, del.	47.19	47.69	47.69	48.19
McKeesRocks, del.	46.95	47.45	47.45	47.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	47.44	47.94	47.94	48.44
Verona, del.	47.90	48.40	48.40	48.90
Brackenridge, del.	48.13	48.63	48.63	49.13
Bessemer, Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	46.00	46.50	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Struthers, O. S16	46.00	....	....	....
Swedeland, Pa. A3	48.00	48.50	49.00	49.50
Philadelphia, del.	49.44	49.94	50.44	50.94
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard, O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O. del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson, O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls, N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2..	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 x 6)

Lyles, Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton, Pa. B2	54.00
Philadelphia delivered	57.00
Troy, N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, May 11, 1950; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 .....$50.00
Munhall,Pa. C3 .....50.00

INGOTS, Alloy (NT)
Detroit R7 .....$51.00
Houston,Tex. S5 .....59.00
Midland,Pa. C18 .....51.00
Munhall,Pa. C3 .....51.00
So.Duquesne,Pa. C3 ...51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)
Bessemer,Pa. C3 .....$53.00
Clairton,Pa. C3 .....53.00
Conshohocken,Pa. A3 ..58.00
Ensley,Ala. T2 .....53.00
Fairfield,Ala. T2 .....53.00
Fontana,Cal. K1 .....72.00
Gary,Ind. C3 .....53.00
Johnstown,Pa. B2 .....53.00
Lackawanna,N.Y. B2..53.00
Munhall,Pa. C3 .....53.00
Sharon,Pa. S3 .....57.00
So.Chicago,Ill. C3 ....53.00
So.Duquesne,Pa. C3 ...53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 .....$63.00
Buffalo R2 .....63.00
Canton,O. R2 .....63.00
Clairton,Pa. C3 .....63.00
Cleveland R2 .....63.00
Conshohocken,Pa. A3..65.00
Detroit R7 .....63.00
Ensley,Ala. T2 .....63.00
Fairfield,Ala. T2 .....63.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 .....63.00
Geneva,Utah G1 .....63.00
Houston,Tex. S5 .....71.00
Ind.Harbor,Ind. I-2 ...63.00
Johnstown,Pa. B2 ....63.00
Lackawanna,N.Y. B2..63.00
Los Angeles B3 .....82.00
Munhall,Pa. C3 .....63.00
Seattle B3 .....82.00
So.Chicago C3,R2,W14.63.00
So.Duquesne,Pa. C3 ..63.00
So.SanFrancisco B3 ...82.00
Warren,O. C17 .....63.00

Alloy (NT)
Bethlehem,Pa. B2 ....$66.00
Buffalo R2 .....66.00
Canton, O. R2, T7 ....66.00
Conshohocken,Pa. A3..68.00
Detroit R7 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 .....66.00
Houston,Tex. S5 .....74.00
Ind.Harbor,Ind. Y1 ...66.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2..66.00
LosAngeles B3 .....86.00
Massillon,O. R2 .....66.00
Midland,Pa. C18 .....66.00
Munhall,Pa. C3 .....66.00
Sharon,Pa. S3 .....66.00
So.Chicago C3,R2,W14. 66.00
So.Duquesne,Pa. C3 ..66.00
Warren,O. C17 .....66.00
Youngstown Y1 .....66.00

SHEETS BARS (NT)
Mansfield,O. E6 .....$58.00
Sharon,Pa. S3 .....57.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$76.00
Cleveland R2 .....76.00
Ind.Harbor,Ind. I-2 ...76.00
Massillon,O. R2 .....76.00
So.Chicago,Ill. R2 ....76.00

SKELP
Aliquippa,Pa. J5 .....3.25
Munhall,Pa. C3 .....3.15
Warren,O. R2 .....3.15
Youngstown C3, R2 ....3.15

WIRE RODS
AlabamaCity,Ala. R2 ..3.85
Buffalo W12 .....3.85
Cleveland A7 .....3.85
Donora,Pa. A7 .....3.85
Fairfield,Ala. T2 .....3.85
Houston,Tex. S5 .....4.25
Ind.Harbor,Ind. Y1 ....3.85
Johnstown,Pa. B2 ....3.85
Joliet,Ill. A7 .....3.85
LosAngeles B3 .....4.65
Minnequa,Colo. C10 ....4.10
Monessen,Pa. P7 .....3.85
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 ...4.50
Portsmouth,O. P12 ....3.85
Roebling,N.J. R5 .....3.95
So.Chicago,Ill. R2 .....3.85
SparrowsPoint B2 .....3.95
Sterling,Ill.(1) N15 ....3.85
Struthers,O. Y1 .....3.85
Torrance,Calif. C11 ....4.65

STRUCTURALS
Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 .....3.40
Bessemer,Ala. T2 .....3.40
Bethlehem,Pa. B2 .....3.45
Clairton,Pa. C3 .....3.40
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Houston, Tex. S5 .....3.80
Ind.Harbor,Ind. I-2 ....3.40
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.00
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.00
Minnequa,Colo. C10 ....3.75
Munhall,Pa. C3 .....3.40
Niles,Calif.(22) P1 ....4.02
Phoenixville,Pa. P4 ....3.30
Portland,Oreg. O4 .....3.90
Seattle B3 .....4.05
So.Chicago,Ill. C3, W14.3.40
So.SanFrancisco B3 ....3.95
Torrance,Calif. C11 ....4.00
Weirton,W.Va. W6 .....3.40

Alloy Stand. Shapes
Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05

H.-S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 .....5.15
Bessemer,Ala. T2 .....5.15
Bethlehem,Pa.(14) B2 ..5.20
Clairton,Pa. C3 .....5.15
Fairfield,Ala T2 .....5.15
Fontana,Calif. K1 .....5.75
Gary,Ind. C3 .....5.15
Ind.Harbor,Ind. I-2, Y1.5.15
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y.(14)B2 5.20
Munhall,Pa. C3 .....5.15
So.Chicago,Ill. C3 .....5.15
Struthers,O. Y1 .....5.15

Wide Flange
Bethlehem,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Munhall,Pa. C3 .....3.40
So.Chicago,Ill. C3 .....3.40

H.-S., I-A Wide Flange
Munhall,Pa. C3 .....5.10
So.Chicago,Ill. C3 .....5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.20
Lackawanna,N.Y. B2 ..4.20
Munhall,Pa. C3 .....4.20
So.Chicago,Ill. C3 .....4.20
Weirton,W.Va. W6 ....4.20

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.50
Aliquippa,Pa. J5 .....3.50
Ashland,Ky.(15) A10 ..3.50
Bessemer,Ala. T2 .....3.50
Clairton,Pa. C3 .....3.50
Claymont,Del. W16 ....3.60
Cleveland J5, R2 .....3.50
Coatesville,Pa. L7 ....3.60
Conshohocken,Pa. A3 ..3.60
Ecorse,Mich. G5 .....3.75
Fairfield,Ala. T2 .....3.50
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.50
Geneva,Utah G1 .....3.50
Harrisburg,Pa. C5 ....3.50
Houston,Tex. S5 .....3.90
Ind.Harbor,Ind. I-2, Y1.3.50
Johnstown,Pa. B2 .....3.50
Lackawanna,N.Y. B2 ..3.50
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.50
Pittsburgh J5 .....3.50
Seattle B3 .....4.40
Sharon,Pa. S3 .....3.50
So.Chicago,Ill. C3, W14.3.50
SparrowsPoint,Md. B2..3.50
Steubenville,O. W10 ....3.50
Warren,O. R2 .....3.50
Weirton,W.Va. W6 ....3.50
Youngstown C3, R2, Y1.3.50

PLATES (Universal Mill)
Fontana,Calif. K1 .....4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.25

PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ..4.40
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

PLATES, Wrought Iron
Economy,Pa. B14 .....7.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.35
Bessemer,Ala. T2 .....5.35
Clairton,Pa. C3 .....5.35
Cleveland J5, R2 .....5.35
Conshohocken,Pa. A3 ..5.35
Ecorse,Mich. G5 .....5.60
Fairfield,Ala. T2 .....5.35
Fontana,Calif. K1 .....5.95
Gary,Ind. C3 .....5.35
Geneva,Utah G1 .....5.35
Houston,Tex. S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.35
Johnstown,Pa. B2 .....5.35
Munhall,Pa. C3 .....5.35
Pittsburgh J5 .....5.35
Sharon,Pa. S3 .....5.35
So.Chicago,Ill. C3 .....5.35
SparrowsPoint,Md. B2 ..5.35
Warren,O. R2 .....5.35
Youngstown Y1 .....5.35

FLOOR PLATES
Cleveland J5 .....4.55
Conshohocken,Pa. A3 ..4.55
Harrisburg,Pa. C5 .....4.55
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.75
Ashland,lcl(15) A10 ...4.25
Cleveland,cl R2 .....4.10
Warren,O.cl R2 .....4.10

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.45
Aliquippa,Pa. J5 .....3.45
Alton,Ill.(1) L1 .....3.45
Ashland,Ky.(17) A10 ..3.45
Atlanta,Ga. A11 .....3.60
Bessemer,Ala. T2 .....3.45
Buffalo R2 .....3.45
Canton,O. R2 .....3.45
Clairton,Pa. C3 .....3.45
Cleveland R2 .....3.45
Ecorse,Mich. G5 .....3.65
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 .....4.05
Lackawanna,N.Y. B2 ..3.45
Los Angeles B3 .....4.15
Midland,Pa. C18 .....3.45
Milton,Pa. B6 .....3.45
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.17
N.Tonawanda,N.Y. B11 .3.45
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
Portland,Oreg. O4 .....4.20
Seattle B3, N14 .....4.20
So.Chicago C3, R2, W14.3.45
So.Duquesne,Pa. C3 ....3.45
S.SanFran.,Cal. B3 ....4.20
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Weirton,W.Va. W6 ....3.45
Youngstown C3, R2 ....3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.45
Atlanta A11 .....3.60
Johnstown,Pa. B2 .....3.45
Lackawanna,N.Y. B2 ..3.45
Niles,Calif. P1 .....4.17
Pittsburgh(23) J5 .....3.45
Portland,Oreg. O4 .....4.20
SanFrancisco S7 .....4.00
Weirton,W.Va. W6 ....3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....3.95
Buffalo R2 .....3.95
Canton,O. R2, T7 .....3.95
Clairton,Pa. C3 .....3.95
Ecorse,Mich. G5 .....4.25
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....3.95
Houston,Tex. S5 .....4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 .....3.95
KansasCity,Mo. S5 .....4.55
Lackawanna,N.Y. B2 ..3.95
Los Angeles B3 .....5.00
Massillon,O. R2 .....3.95
Midland,Pa. C18 .....3.95
So.Chicago C3, R2, W14.3.95
So.Duquesne,Pa. C3 ....3.95
Struthers,O. Y1 .....3.95
Warren,O. C17 .....3.95
Youngstown C3 .....3.95

BARS, Hot-Rolled Ingot Iron
Ashland,Ky.(17) A10 ..3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.20
Bessemer,Ala. T2 .....5.20
Bethlehem,Pa. B2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland R2 .....5.20
Ecorse,Mich. G5 .....5.40
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....6.25
Gary,Ind. C3 .....5.20
Ind.Harbor,Ind. I-2, Y1.5.20
Johnstown,Pa. B2 .....5.20
Lackawanna,N.Y. B2 ..5.20
Pittsburgh J5 .....5.20
So.Duquesne,Pa. C3 ....5.20
Struthers,O. Y1 .....5.20
Youngstown C3 .....5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 .....4.15
Ambridge,Pa. W18 .....4.15
BeaverFalls,Pa. M12,R2.4.15
Buffalo B5 .....4.15
Camden,N.J. P13 .....4.63
Carnegie,Pa. C12 .....4.15
Chicago W18 .....4.15
Cleveland A7, C20 .....4.15
Detroit P17 .....4.30
Donora,Pa. A7 .....4.15
Ecorse,Mich. G5 .....4.35
Elyria,O. W8 .....4.15
FranklinPark,Ill. N5 ...4.15
Gary,Ind. R2 .....4.15
Hammond,Ind. L2, M13.4.15
Hartford, Conn. R2 ....4.55
Harvey,Ill. B5 .....4.15
LosAngeles R2 .....5.55
Mansfield,Mass. B5 ....4.55
Massillon,O. R2, R8....4.15
Midland,Pa. C18 .....4.15
Monaca,Pa. S17 .....4.15
Newark,N.J. W18 .....4.55
Plymouth.Mich. P5 ....4.40
Pittsburgh J5 .....4.10
Putnam, Conn. W18 ....4.55
Readville,Mass. C14 ...4.55
St.Louis,Mo. M5 .....4.55
So.Chicago,Ill. W14 ...4.15
SpringCity,Pa.(5) K3 ..4.55
Struthers,O. Y1 .....4.15
Waukegan,Ill. A7 .....4.15
Youngstown F3, Y1 ....4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 .....4.90
Ambridge,Pa. W18 .....4.90
BeaverFalls,Pa. M12 ...4.90
Bethlehem,Pa. B2 .....4.90
Buffalo B5 .....4.90
Canton,O. R2, T7 .....4.90
Carnegie,Pa. C12 .....4.90
Chicago W18 .....4.90
Cleveland A7, C20 .....4.90
Detroit P17 .....5.05
Donora,Pa. A7 .....4.90
Elyria,O. W8 .....4.90
Gary,Ind. R2 .....4.90
Hammond,Ind. L2, M13.4.90
Hartford,Conn. R2 .....5.20
Harvey,Ill. B5 .....4.90
Lackawanna,N.Y. B2 ..4.90
Mansfield,Mass. B5 ....5.20
Massillon,O. R2, R8 ...4.90
Midland,Pa. C18 .....4.90
Monaca,Pa. S17 .....4.90
Newark,N.J. W18 .....5.20
Plymouth,Mich. P5 .....5.10
So.Chicago,Ill. R2, W14.4.90
Struthers,O. Y1 .....4.90
Waukegan,Ill. A7 .....4.90
Warren,O. C17 .....4.90
Worcester,Mass. A7 ....5.20
Youngstown F3, Y1 ....4.90

RAIL STEEL BARS
ChicagoHts. (3) C2, I-2 .3.30
ChicagoHts. (4) C2, I-2 .3.45
Franklin,Pa. (3) F5 ...3.30
Franklin,Pa. (4) F5 ...3.45
FortWorth,Tex.(26) T4 .4.33
Huntngtn,W.Va.(3) W7 .3.45
Moline,Ill.(3) R2 .....3.40
SouthAvis,Pa.(2) J8 ...3.30
SouthAvis,Pa.(41) J8 ..3.30
SouthAvis,Pa.(42) J8 ..3.30
Williamsport(2,3) S19 ..3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14.9.50
Economy,Pa.(D.R.)B14 11.00
Economy,(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng. Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1..12.25
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ...4.35
Los Angeles B3 .....5.00
Seattle B3, N14 .....5.10
SouthAvis,Pa. J8 .....4.35
So.SanFrancisco B3 ....5.00
SparrowsPt., ¼-1" B2 ..4.35
Williamsport,Pa. S19 ..4.35

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.45
Alton,Ill.(6) L1 .....3.45
Atlanta,Ga. A11 .....3.60
Buffalo R2 .....3.45
Cleveland R2 .....3.45
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 .....3.45
Fontana,Calif. K1 .....4.10
Gary,Ind. C3 .....3.45
Houston,Tex. S5 .....3.85
Ind.Harbor,Ind. I-2,Y1..3.45
Johnstown,Pa. B2 .....3.45
KansasCity,Mo. S5 ....4.05
Lackawanna,N.Y. B2 ..3.45
LosAngeles B3 .....4.15
Milton,Pa. B6 .....3.45
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.17
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 .....3.45
SandSprings,Okla. S5 ..4.35
Seattle,Wash. B3, N14..4.20
SouthAvis,Pa. J8 .....3.45
So.Chicago,Ill. R2 .....3.45
So.Duquesne,Pa. C3 ....3.45
So.SanFrancisco B3 ....4.20
SparrowsPoint,Md. B2 ..3.45
Struthers,O. Y1 .....3.45
Torrance,Calif. C11 ....4.15
Youngstown C3, R2 ....3.45

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 .....4.20
Fontana,Calif. K1 .....4.95
Gary,Ind. C3 .....4.20
Youngstown C3 .....4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 .....3.35
Cleveland J5, R2 .....3.35
Conshohocken,Pa. A3 ..3.45
Ecorse,Mich.(8) G5 ....3.55
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.25
Gary,Ind. C3 .....3.35
Ind.Harbor,Ind. I-2, Y1.3.35
Irvin,Pa. C3 .....3.35
Lackawanna,N.Y. B2 ..3.35
Munhall,Pa. C3 .....3.35
Niles,O. M4 .....3.75
Pittsburg,Calif. C11 ...4.05
Pittsburgh J5 .....3.35
Sharon,Pa. S3 .....3.35
So.Chicago,Ill. W14 ....3.35
SparrowsPoint,Md. B2 ..3.35
Steubenville,O. W10 ....3.35
Torrance,Calif. C11 ....4.05
Warren,O. R2 .....3.35
Weirton,W.Va. W6 .....3.35
Youngstown C3, Y1 ....3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 .....4.65
Ind.Harbor,Ind. I-2 ....4.40
Mansfield,O. E6 .....4.15
Niles,O. N12 .....4.10
Niles,O. M4 .....4.65
Torrance,Calif. C11 ....5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.05
Conshohocken,Pa. A3 ..5.05
Ecorse,Mich. G5 .....5.25
Fairfield,Ala. T2 .....5.05
Fontana,Calif. K1 .....6.74
Gary,Ind. C3 .....5.05
Ind.Harbor,Ind. I-2, Y1..5.05
Irvin,Pa. C3 .....5.05
Lackawanna(35) B2 ...5.05
Pittsburgh J5 .....5.05
Sharon,Pa. S3 .....5.05
So.Chicago,Ill. C2 .....5.05
SparrowsPoint(36) B2 ..5.05
Warren,O. R2 .....5.05
Weirton,W.Va. W6 .....5.05
Youngstown, C3, Y1....5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.20
Ecorse,Mich. G5 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. C3 .....6.20
Ind.Harbor,Ind. I-2, Y1..6.20
Irvin,Pa. C3 .....6.20
Lackawanna(37) B2 ...6.20
Pittsburgh J5 .....6.20
Sharon,Pa. S3 .....6.20
SparrowsPoint(38) B2 ..6.20
Warren,O. R2 .....6.20
Weirton,W.Va. W6 .....6.20
Youngstown Y1 .....6.20

UNIVERSITY OF MICHIGAN LIBRARIES

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	4.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'vd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	*$6.45*
Gary,Ind. C3	*6.35*
Irvin,Pa. C3	*6.35*
Yorkville,O. W10	*6.35*

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

SHEETS, Culvert No. 16	**Cu Alloy**	**Cu Fe**
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif. C11	4.05

SHEETS, Aluminized

Butler,Pa. A10	7.75

TIN PLATE, Electrolytic (Base Box)	**0.25 lb**	**0.50 lb**	**0.75 lb**
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	**Field**	**Arma-ture**	**Elec-tric**	**Motor**	**Dyna-mo**
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	...	6.20	6.70	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Parkersburg F4 (cut lengths)	...	...	6.70	7.95	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower) Transformer Grade	**72**	**65**	**58**	**52**
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths)	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	**T-100**	**T-90**	**T-80**	**T-73**
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	**1.25 lb**	**1.50 lb**
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4	7.50	7.70
Ind.Harbor I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
Sharon,Pa. S3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Conshohocken,Pa. A3	3.35
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.50
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)	**0.26-0.40C**	**0.41-0.60C**	**0.61-0.80C**	**0.81-1.05C**	**1.06-1.35C**
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	....	...	6.85	8.80	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	....	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.15
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	4.15
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.40
Detroit, D2	4.40
Detroit M1	4.35
Dover,O.(40) G6	4.15
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.15
Fontana,Calif. K1	5.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.15
NewCastle,Pa. B4	4.15
NewCastle,Pa.(40) E5	4.15
NewHaven,Conn. A7, D2	4.65
New York W3	5.00
Pawtucket,R.I.(21) N8	4.65
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.15
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	4.65
Wallingford,Conn. W2	4.65
Warren,O.(40) T5	4.15
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton, W. Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.
C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H4 Heppenstall Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11	3.60
Riverdale,Ill. A1	3.60
Sharon,Pa. S3	*3.40*
Youngstown C3	3.60

WIRE, MB Spring, HighCarbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester A7,J4,T6,W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. M8	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. M8	8.45
Fostoria,O. S1	8,45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

WIRE, Tire Bead

Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20	4.50
Crawfordsville,Ind. M8	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
Los Angeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark, 6-Sga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

WIRE Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
Los Angeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So. Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed

	Col.
AlabamaCity, Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Crawfordsville M8	128
Donora,Pa A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	116
Duluth A7	116
Franklin,Pa. F5	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity, Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. M8	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville M8	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity, Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock To Dealers & Mfrs. (7) Col.

AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. M8	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. M8	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N. Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburgh,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W. Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Sheelton,Pa. B2	4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.85
Pittsburgh O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo, C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensely,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	3.75

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr.2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr.2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr, 1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo.	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron&Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Div. Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Wsrn.Auto. Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.15c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.40c, 0.035" and heavier.
(41) Flats.
(42) Bands.

UNIVERSITY OF MICHIGAN LIBRARIES

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	8.5	9.0	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11.0	8.5
⅜	6.0	0.57	29.0	27.0	28.0	5.5	8.0	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30.0	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ⅛" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜", W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding	Plates Carbon Base		Strip Cold-Rolled Carbon Base		Sheets Carbon Base		Copper Base
Stainless	10%	20%	10%	Both sides	10%	20%	Both Sides
302	....	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	20.00†	24.25‡	....	....	....

* Deoxidized. † 16.50c for hot-rolled. ‡ 21.00c for hot-rolled. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville L7; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam.. 27
- ⅝-in. & ¾-in. 29
- ⅞-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter 30
- over 6 in. long..... 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up Bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:	Reg.	Heavy
½-in. and smaller	25	
⅝-in. & ¾-in.	23	
⅞-in.-1½-in.	23	
1⅝ in. and larger.....	16	
H.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ¾-in..	28	25
⅞-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16
C.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ¾-in..	30	27
⅞-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Hvy.	Reg.	Lght.
½-in. and smaller ...	35	41	41
⅝-in. & ¾-in.	30	36	36
⅞-in.-1½ in..	27	31	33
1⅝-in. & larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ½-in. through ⅝-in. .. 50
- ¾-in. through 1 in. .. 43

Longer than 6 in.:
- ½-in. through ⅝-in... 33
- ¾-in. through 1 in... 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 41
¼-in. diam. & larger ... 24
N.F. thread, all diams. . 18

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.25c
⅞-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Type 301 through 347 sheet, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge,Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk,N.Y. bars, wire A4.
Duquesne, Pa., bars C3.
Fort Wayne, Ind., bars and and wire, except Types 501 and 502 J6.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Harrison, N. J., Types 302, 304, 316 wire and strip D6.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c. Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 22.00
Toluol, one deg..19.00-24.75
Industrial xylol ..20.50-26.50

Per ton bulk, ovens
Sulphate of ammonia..$45.00

Cents per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.50
Do., less than carlots..14.25
Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots..	15.00
Swedish, c.i.f. New York, in bags....7.40-8.50	
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..70.00-135.00	
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots..23.25-26.25	
Copper:	
Electrolytic	27.75
Reduced	27.00
Lead	18.50
Manganese:	
Minus 100-mesh 52.00-55.00	
Minus 35 mesh	48.00
Minus 200 mesh....	56.00
Nickel, unannealed61.00-66.00	
Silicon 34.00-40.00	
Solder (plus cost of metal)	8.50
Stainless Steel, 302...	75.00
Tin	86.50
Zinc, 10-ton lots..15.25-18.00	
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8%, minus 65 mesh, freight allowed.	
1000 lb and over..	2.90
less than 1000 lb..	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb.....	2.25
200 to 500 lb	2.60
less than 200 lb...	2.75
82-88%, freight allowed, 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll,fur. .$14.00-14.50
Connellsvll,fdry. .15.50-16.50
New River, foundry...19.00
Wise county, foundry..15.95
Wise county, furnace..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.00
Everett, Mass., ovens
New England, del.‡ 23.40
Chicago, ovens 21.00
Chicago, del. .....†22.45
Detroit, del. 24.91
Terre Haute, ovens...21.20
Milwaukee, ovens 21.75
Indianapolis, ovens 20.75
Chicago, del. 24.12
Cincinnati, del. 23.67
Detroit, del. 24.65
Ironton, O., ovens.....20.40
Cincinnati, del. 22.71
Painesville, O., ovens..21.90
Buffalo, del. 24.02
Cleveland, del. 23.62
Erie, del. 22.04
Birmingham, ovens 19.15
Philadelphin, ovens ...21.25
Neville Island,Pa.,ovens 21.00
Swedeland, Pa., ovens.21.20
Portsmouth, O., ovens..20.15
Cincinnati, del. 22.71
Detroit, ovens 21.65
Detroit, del. 22.65
Buffalo, del. 24.00
Flint, del. 24.09
Pontiac, del. 23.04
Saginaw, del. 24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.75	6.84	7.25	6.04	...	5.85	6.64	8.60	5.65	5.90	7.34
New York(c'try)	5.55	6.64	7.05	5.84	...	5.65	6.44	8.40	5.45	5.70	7.14
Boston (city) ..	5.93	6.68	7.19	5.98	...	5.80	6.50	8.70	5.75	6.08	7.28
Boston (c'try) .	5.73	6.48	6.99	5.78	...	5.60	6.30	8.50	5.55	5.88	7.08
Phila. (city) ..	6.45	6.60	6.95	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try)..	6.20	6.35	6.70	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.25	6.44	6.66	5.79	...	5.69	6.39	...	5.69	5.40	7.04
Balt. (c'try) ..	5.05	6.24	6.46	5.59	...	5.49	6.19	...	5.49	5.20	6.84
Norfolk, Va. ..	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.46	...	...	6.00	...	5.90	6.62	...	5.90	5.61	7.25
Buffalo (del.)..	5.25	6.00	7.00	5.61	...	5.25	5.95	10.10††[5]	5.35	5.65	6.95
Buffalo (w'hse)	5.05	5.80	6.80	5.41	...	5.05	5.75	9.90††[5]	5.15	5.45	6.75
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	6.03	9.86††[5]	5.44	5.59	6.68
Cleveland (del.)	5.25	6.00	7.15	5.44	6.35	5.32	5.95	8.31	5.37	5.52	6.72
Cleve. (w'hse).	5.05	5.80	6.95	5.24	6.15	5.12	5.75	8.16	5.17	5.32	6.52
Cincin. (w'hse).	5.32	5.84	6.44	5.49	...	5.39	6.10	9.90††[5]	5.44	5.59	6.75
Chicago (city) .	5.25	6.00*	6.90	5.30	...	5.20	5.85	9.75††[5]	5.25	5.40	6.60
Chicago (w'hse)	5.05	5.80*	6.70	5.10	...	5.00	5.65	9.55††[5]	5.05	5.20	6.40
Milwaukee(city)	5.39	6.14*	7.04	5.44	...	5.34	6.09	9.89††[5]	5.39	5.54	6.74
Milwau. (c'try).	5.19	5.94*	6.84	5.24	...	5.14	5.89	9.69††[5]	5.19	5.34	6.54
St. Louis (del.).	5.58	6.33	7.23	5.63	...	5.53	6.28	10.08††[5]	5.58	5.73	6.93
St. L. (w'hse).	5.38	6.13	7.03	5.43	...	5.33	6.08	9.88††[5]	5.38	5.53	6.73
Birm'ham (del.)	5.20[10]	5.95	6.30[3]	5.25[10]	...	5.15[10]	6.88	...	5.20[10]	5.35[10]	7.63[10]
Birm'hm(w'hse)	5.05[10]	5.80	6.15[3]	5.10[10]	...	5.00[10]	...	...	5.05[10]	5.20[10]	...
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.00	7.50	7.03[3]	6.05	8.30	6.00	7.75	...	5.90	6.00	8.20
L. A. (w'hse)..	5.80	7.30	7.50[3]	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25[9]	7.60[3]	7.50[3]	6.75[9]	8.25[3]	6.15[9]	7.55	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]
Kans. (w'hse).	5.65	6.40	7.30	5.70	...	5.60	6.35	10.10	5.65	5.80	7.00

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [8]—300 to 499 lb; [9]—400 to 9999 lb; [10]—500 to 9999 lb inclusive.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx,) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed. $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P. 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.), Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 143)

UNIVERSITY OF MICHIGAN LIBRARIES

Lead, Zinc Prices Rise Further

Strength in market is sustained on active demand for limited supplies. Lead now 11.80c and zinc 12.00c, St. Louis. Straits tin advances to about 77.75c

New York—Spurred by prospects of continued high level industrial activity over the balance of this year, consumers of metals are pressing to cover their anticipated needs as far ahead as possible.

Galvanizers, tin plate producers, brass mills, and other large users of metals are buying tonnages as rapidly as they are made available. Producers' stocks have been reduced to low levels, forcing sellers to rely on current production and imports to cover their customers' requirements. This situation has resulted in a steady rise in prices.

Lead advanced to 11.80c, St. Louis, on May 11 and is now 1.50 cents a pound higher than it was a month ago. Zinc advanced to 12.00c, E. St. Louis, on May 9 and is now 1.75 cents a pound higher than it was on Apr. 1. Although copper prices have not changed since Apr. 18, when the price advanced 1 cent to 19.50c, undertone of the market is strong and a further rise would not be surprising. Tin has advanced to around 77.75c, the highest level since mid-March.

Disruption of shipments of raw materials and finished goods as a result of the railroad strike is expected to adversely affect the metalworking industry. Curtailment of operations will be in direct proportion to the length of the strike.

Lead Deliveries Increasing

New York — A leading custom smelter advanced the price of lead ¼-cent a pound on May 10 and an additional ½-cent on May 11 to the basis of 11.80c, St. Louis. These moves were followed by other sellers. Sheet lead and lead pipe are following the advances in primary metal.

While consumption of lead has improved, widespread feeling that the price eventually would work up to the present level brought out considerable covering of future needs. Lead bought for delivery this month is the largest for any month since 1948.

Fair volume of business was done in all directions following the advances, with at least one seller still having a waiting list of consumers who wish to place business on a flat price basis.

Zinc Stocks Dwindle

New York—Prime western zinc advanced ½-cent on May 9 to the basis of 12.00c, St. Louis, the highest level quoted since one year ago. Only a small volume of business is being done at that level, due to the extremely tight supply position. Most orders are booked on an average price basis.

"I would not be surprised if the zinc price would go considerably higher in the next few months if government stockpiling purchases of the metal continue," Clinton H. Crane, chairman, St. Joseph Lead Co. told stockholders last week.

Stocks continue to dwindle with consumption remaining at a high level. Shipments of slab zinc totaled 83,133 tons in April compared with 85,589 tons in March. Stocks held by smelters and producers were 52,520 tons at the end of April, a decrease of 7256 tons from the Mar. 31 total. Smelter production of zinc totaled 75,877 tons in April against 77,946 tons in March. Unfilled orders on hand at the end of April amounted to 57,486 tons against 55,433 tons at the end of the preceding month.

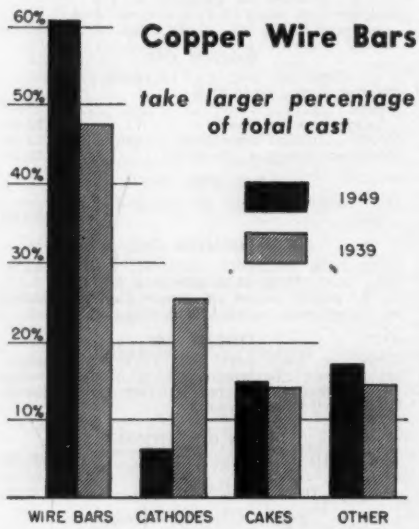
Tin Buying Interest Lags

New York — Tin prices have advanced gradually to around 77.75c in a rather quiet market. Tin plate makers are taking fair tonnages, but other users seem to be content to buy on a hand-to-mouth basis.

Copper Supplies Tighten

New York — Strong demand for June copper has bolstered sales for delivery in that month to the sold-out level. Since many consumers are still seeking metal to cover their needs, a strong price tone prevails.

Domestic production is not sufficient to cover consuming needs, necessitating importation of substantial tonnages. Imports of refined copper into the United States in March amounted to only 18,803 tons, representing a further decrease of about 2700 tons. Compared with January, the March imports are off about 12,000 tons. Total imports in the first quarter amounted to 70,857 tons, or 15,000 tons less than in the like period a year ago. Blister copper imports increased, however, amounting to 58,052 tons in the first quarter compared with 35,593 tons in the like period a year ago.



Shortages of certain shapes are the result of labor difficulties at important refineries earlier in the year. Extensive rural electrification program plus increased use of commutator bars and copper wire has resulted in a larger proportion of copper to be cast as wire bars now than in prewar years. There has been a sharp reduction in the proportion of copper cast as cathodes.

Brass Mill Product Prices Rise

New York—Prices for copper products advanced 1.25 cents while copper alloy products advanced as much as 1.625 cents a pound, effective May 10. The new prices give effect to increased manufacturing costs; a one-cent advance in the price of zinc to 11.50c since Apr. 18, but do not reflect the ½-cent a pound advance in the market on May 9; the ¾-cent advance in lead prices since Apr. 18, but do not reflect the ¼-cent advance on May 10. They are still based on 19.50c for copper.

The advance in copper products reflects only increased cost of manufacture. Copper alloy products were advanced in proportion to the higher prices for zinc and lead plus increased costs of manufacture.

Productivity in Metals Dips

Washington—Number of man-hours expended per pound of metal produced in the primary smelting and refining of copper, lead and zinc rose about 0.5 per cent from 1947 to 1948, reports Bureau of Labor Statistics. Interruptions in supply of ore to smelters contributed to increase unit labor requirements. Production decline of 4 per cent led to a decrease in the percentage of smelting capacity utilized.

Crude copper output decreased in 1948 due to work stoppages at the mines. Output of zinc smelters also fell off slightly as labor shortages, work stoppages, and lack of power in some areas hindered operations. Lead production, on the other hand, increased moderately as the stimulus of high prices bolstered by government demand for stockpiling made working of marginal mines profitable. Increase in lead output was insufficient, however, to offset the decline in total smelter and refinery output of copper, lead and zinc.

The number of man-hours expended per pound of output increased nearly 16 per cent between 1940 and 1945. In response to wartime demand, the output of nonferrous metals increased until 1942 when production began to decline in the face of severe labor shortages in all segments of the industry. In addition, a general decline in the grade of ore mined contributed to the wartime trend of rising unit labor requirements. Uncertainty regarding wartime regulations, continuing inadequate labor supply, and early postwar strikes resulted in further declines in production and increases in man-hours per unit of output in 1946.

Unit man-hour requirements declined 8 per cent in 1947 from the abnormal 1946 level. General improvement in the overall labor supply and the impetus of heavy demand and high prices encouraged increased production and accounted for the decline in unit man-hours.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 19.50c, Conn. Valley; Lake, 19.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 18.75c; 88-10-2 (No. 215) 25.75c; 80-10-10 (No. 305) 22.25c; No. 1 yellow (No. 405) 16.50c.

Zinc: Prime western 12.00c; brass special 12.25c, intermediate 12.50c, East St. Louis; high grade 13.10c, delivered.

Lead: Common 11.80c; chemical 11.90c; corroding 11.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 17.00c; No. 12 foundry alloy (No. 2 grade) 16.25-16.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.50-17.75c; grade 2, 16.75-17.00c; grade 3, 15.50-15.75c; grade 4, 14.75-15.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 77.75c; May del. 77.62½c; June del. 77.00c; July del. 76.87½c; Aug. del. 76.75c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese and Yugoslavian, 22.00c; English and Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $71-$74 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 72.75c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.
Iridium: $100 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 19.50-cent copper.)

Sheet: Copper 34.43; yellow brass 31.19; commercial bronze, 95%, 34.38; 90%, 33.93; red brass, 85% 32.96; 80%, 32.52; best quality, 32.04; nickel silver, 18%, 44.49; phosphor-bronze, grade A, 5% 52.21.

Rods: Copper, hot-rolled 30.28; cold-drawn 31.53; yellow brass free cutting, 30.88; commercial bronze, 95% 34.07; 90% 33.62; red brass 85% 32.65; 80% 32.21.

Seamless Tubing: Copper 34.47; yellow brass 34.20; commercial bronze 90% 36.59; red brass 85% 35.87; 80% 35.43.

Wire: Yellow brass 31.48; commercial bronze, 95% 34.67; 90% 34.22; red brass, 85% 33.25; 80% 32.81; best quality brass 32.33.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.54c, l.c.l. 24.17, c.l. 23.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.60, l.c.l. 26.35, c.l. 25.85; magnet, delivered, 15,000 lb or more 29.50, l.c.l. 30.25.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	....	....
0.156-0.203	41.0	....	....
0.219-0.313	38.0	....	....
0.344	37.0	....	47.0
0.375	36.5	45.5	44.0
0.406	36.5	....	....
0.438	36.5	45.5	44.0
0.469	36.5	....	....
0.500	36.5	45.5	44.0
0.531	36.5	....	....
0.563	36.5	....	41.5
0.594	36.5	....	....
0.625	36.5	43.0	41.5
0.656	36.5	....	....
0.688	36.5	....	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	....	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	....	36.5
1.625	33.5	....	36.5
1.688-2.000	33.5	....	....
2.125-2.500	32.5	....	....
2.625-3.375	31.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $16.25 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $16.25 per cwt. Traps and bends; List price plus 40%.

ZINC

Sheets, 16.75c f.o.b. mill, 36,000 lb and over, Ribbon zinc in coils, 16.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 15.00c; over 12-in., 16.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled, 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb. 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 29.84c; oval 29.34c; cast 27.87½c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 46.50c, under 1000 lb 48.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl. 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 93.00c, 500 to 999 lb, 93.5c; 200 to 499 lb, 94.00c; less than 200 lb, 95.5c, ball, 1000 lb and over, 95.25c; 500 to 999 lb, 95.75c; 200 to 499 lb 96.25c; less than 200 lb, 97.75c, f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 59.2c, 100 or 300 lb drums only, 100 to 500 lb, 50.9c; 600 to 1900 lb, 48.5c; 2000 to 9900 lb, 46.8c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 40.00c, 10 or more drums 38.00c, f.o.b. Niagara Falls, N. Y.; 41.25c and 39.25c, respectively, del. Cleveland or Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 84.50c; more than 2000 lb, 82.50c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 70.80c; 100 lb kegs 71.80c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	16.50	16.50	15.75
Yellow Brass	13.75	13.50	12.50
Commercial Bronze			
95%	15.50	15.25	14.75
90%	15.375	15.125	14.625
Red brass			
85%	15.125	14.875	14.375
80%	14.875	14.625	14.125
Best Quality (71-80%)	14.50	14.25	13.75

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 16.25; No. 2 copper 15.25; light copper 14.25; composition red brass 13.75; radiators 11.00; heavy yellow brass 10.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 16.25; No. 2 copper 15.25; light copper 14.25; refinery brass (60% copper) per dry copper content 15.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 14.25-14.50; No. 2 13.25-13.50; light copper 12.25-12.50; No. 1 composition red brass 11.75-12.00; No. 1 composition turnings 11.00-11.25; mixed brass turnings 7.00-7.25; new brass clippings 11.25-11.75; No. 1 brass rod turnings 10.00-10.25; light brass 7.00-7.25; heavy yellow brass 7.75-8.00; new brass rod ends 10.50-10.75; auto radiators, unsweated 9.00-9.25; cocks and faucets, 9.50-9.75; brass pipe 9.75-10.00.

Lead: Heavy 9.25; battery plates 5.00; linotype and stereotype 9.50; electrotype 9.00; mixed babbitt 8.50.

Zinc: Old zinc 5.50; new die cast scrap 5.50; old die cast scrap 4.00.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 10.00-10.50; old sheets 7.00-7.50; crankcase 7.00-7.50; borings and turnings 4.00.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
May 11	19.50	11.80	12.00	77.75	17.00	24.50	40.00	72.75
May 10	19.50	11.30	12.00	77.50	17.00	24.50	40.00	72.75
May 9	19.50	11.05	12.00	77.125	17.00	24.50	40.00	72.75
May 8	19.50	11.05	11.50	76.875	17.00	24.50	40.00	72.75
May 4-6	19.50	11.05	11.50	76.75	17.00	24.50	40.00	72.75
May 3	19.50	10.80	11.25	77.25	17.00	24.50	40.00	71.75
May 1-2	19.50	10.80	11.25	76.50	17.00	24.50	40.00	71.75
Apr. Avg.	18.94	10.42	10.69	76.445	17.00	24.50	40.00	71.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

UNIVERSITY OF MICHIGAN LIBRARIES

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, May 11, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

May 11	$31.67
May 4	30.92
Apr. 1950	29.40
May 1949	22.29
May 1945	19.13

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$36.00*
No. 2 Heavy Melt.	30.00-31.00
No. 1 Busheling	34.50-35.50
No. 1 Bundles	*36.00*
No. 2 Bundles	28.00
No. 3 Bundles	25.50-26.50*
Heavy Turnings	*32.50-33.50*
Machine Shop Turnings	*25.50-26.00†*
Mixed Borings, Turnings	*25.50-26.00†*
Short Shovel Turnings	28.50
Cast Iron Borings	26.00
Low Phos. Steel	*39.00-39.50*

Cast Iron Grades

No. 1 Cupola Cast	*37.00-38.00*
No. 1 Machinery Cast	*41.00-42.00*
Charging Box Cast	*37.00-38.00*
Heavy Breakable Cast	*33.50-34.50*

Railroad Scrap*

No. 1 R.R. Heavy Melt.	37.50-38.00‡
Rails, Random Lengths	40.00-41.00
Rails, 2 ft. and under	41.50-42.00
Rails, 18 in. and under	42.50-43.00
Railroad Specialties	39.00-40.00
Axles	37.00-38.00
Angles, Splice Bars	40.00-41.00*

* Nominal.
† Crushers' buying prices.
‡ Brokers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$31.50-32.00*
No. 2 Heavy Melt. Steel	*29.50-30.00*
No. 1 Busheling	*31.50-32.00*
No. 1 Bundles	*31.50-32.00*
No. 2 Bundles	*26.00-26.50*
Machine Shop Turnings	*22.00-22.50*
Mixed Borings, Turnings	24.50-25.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	24.50-25.00
Low Phos.	*32.50-33.00*

Cast Iron Grades

No. 1 Cupola	45.00-45.50
Charging Box Cast	39.50-40.50
Stove Plate	37.00-38.00
Heavy Breakable Cast	34.00-34.50
Unstripped Motor Blocks	32.50-33.50
Brake Shoes	30.50-31.50
Clean Auto Cast	45.50-46.50
No. 4 Wheels	38.50-39.00
Burnt Cast	34.50-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*37.50-38.00*
R.R. Malleable	40.50-41.00
Rails, 3 ft and under	43.00-44.00
Rails, 18 in. and under	45.00-46.00
Rails, Random Lengths	40.00-41.00
Cast Steel	36.00-37.00
Railroad Specialties	37.00-37.50
Uncut Tires	38.00-39.00
Angles, Splice Bars	42.50-43.00

VALLEY

No. 1 Heavy Melt. Steel	*$35.00-35.50*
No. 2 Heavy Melt. Steel	*32.50-33.50*
No. 1 Bundles	*35.00-35.50*
No. 2 Bundles	*28.00-29.00*
Machine Shop Turnings	*24.50-25.50*
Short Shovel Turnings	26.50-27.00
Cast Iron Borings	26.50-27.00
Low Phos.	*36.00-36.50*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*38.00-38.50*

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$28.50*
No. 2 Heavy Melt. Steel	*26.50*
No. 1 Busheling	*27.50*
No. 1 Bundles	*28.50*
No. 2 Bundles	*23.00*
Machine Shop Turnings	*19.50*
Short Shovel Turnings	*21.00-22.00*
Mixed Borings, Turnings	17.00-18.00
Low Phos. Punchings and Plate, elec. fur. grade	*32.00-33.00*
Low Phos. Plate, 5 ft & Under	*32.00-33.00*
Elec. Furnace Bundles	*28.50*
Heavy Turnings	*28.50*
No. 1 Chemical Borings	30.00
Knuckles and couplers	*34.00*
Steel car wheels	34.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	38.50-39.00
No. 1 Yard Cast	34.00
Charging Box Cast	36.00
Heavy Breakable Cast	36.00
Unstripped Motor Blocks	29.00
Clean Auto Cast	*38.50-39.00*
No. 1 Wheels	40.00
Malleable	*41.00-42.00*

CINCINNATI

No. 1 Heavy Melt. Steel	*$32.00*
No. 2 Heavy Melt. Steel	27.00
No. 1 Busheling	*32.00*
No. 1 Bundles	*32.00*
No. 2 Black Bundles	26.00
No. 3 Bundles	*23.00*
Machine Shop Turnings	18.00
Short Shovel Turnings	21.00
Mixed Borings, Turnings	20.00
Cast Iron Borings	21.00

Cast Iron Grades

No. 1 Cupola Cast	45.00
Charging Box Cast	36.00
Stove Plate	*32.00*
Heavy Breakable Cast	*37.50*
Unstripped Motor Blocks	27.00
Brake Shoes	25.00
Clean Auto Cast	45.00
Drop Broken Cast	46.50

Railroad Scrap

No. 1 R.R. Heavy Melt	*34.00*
R.R. Malleable	*38.00*
Rails, Rerolling	*44.00*
Rails, Random Lengths	*40.00*
Rails, 18 in. and under	*48.50*

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	*$25.00-26.00*
No. 1 Bundles	*34.00-35.00*
No. 2 Bundles	*23.00-23.50*
No. 1 Busheling	*33.50-34.00*
Machine Shop Turnings	*19.00-19.50*
Mixed Borings, Turnings	*19.00-19.50*
Short Shovel Turnings	*23.00-23.50*
Cast Iron Borings	*23.00-23.50*
Punchings & Plate Scrap	*33.50-34.00*

Cast Iron Grades

No. 1 Cupola Cast	*38.00-39.00*
Heavy Breakable Cast	*33.00-34.00*
Clean Auto Cast	*43.00-44.00*

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	26.00-26.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	19.00-19.50
Cast Iron Borings	19.00-19.50
Short Shovelings	19.50-20.00
Low Phos.	30.50-31.00

Cast Iron Grades

No. 1 Machinery	38.50-39.00
No. 1 Cupola	36.00-36.50
Stove Plate	33.50-34.50
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-35.50
Specialties	35.00-36.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$25.00-26.00*
No. 2 Heavy Melt. Steel	*21.50-22.50*
No. 1 Busheling	*22.50-23.00*
No. 1 Bundles	*25.00-26.00*
No. 2 Bundles	*19.50-20.00*
Machine Shop Turnings	15.00-15.50
Mixed Borings, Turnings	15.00-15.50
Short Shovel Turnings	*16.00-16.50*
Punchings & Plate Scrap	*26.50-27.00*
Low Phos. Plate, 5 ft & under	*26.50-27.00*
Elec. Furnace Bundles	*25.50-26.00*

Cast Iron Grades

No. 1 Cupola Cast	28.00-28.50
No. 1 Machinery	29.50-30.50
Charging Box Cast	29.00-30.00
Heavy Breakable	29.00-30.00
Unstripped Motor Blocks	22.00-22.50
Malleable	35.50

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$25.00-25.50*
No. 2 Heavy Melt. Steel	21.00-21.50
No. 1 Bundles	*25.00-25.50*
No. 1 Busheling	*23.50-24.00*
Machine Shop Turnings	15.50-16.00
Mixed Borings, Turnings	15.50-16.00
Short Shovel Turnings	18.00-18.50
Bar Crops and Plate	26.50-27.00
Punchings & Plate Scrap	26.50-27.00
Chemical Borings	19.50-20.00

Cast Iron Grades

No. 1 Cupola Cast	32.00-33.00
Mixed Cast	26.50-27.00
Heavy Breakable Cast	29.00-30.00
Stove Plate	*25.00-26.00*

CHICAGO

No. 1 Heavy Melt. Steel	$30.00-31.00
No. 2 Heavy Melt. Steel	28.00-29.00
No. 1 Bundles	30.00
No. 2 Bundles	25.00-26.00
Machine Shop Turnings	20.00-21.00
Mixed Borings, Turnings	21.00-22.00
Short Shovel Turnings	*23.00-24.00*
Cast Iron Borings	21.00-22.00
Low Phos.	34.00-35.00
Elec. Furnace Bundles	31.00-32.00
Heavy Turnings	25.00-26.00
Cut Structurals	34.00-35.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	37.00-38.00
Stove Plate	32.50-33.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	*35.00-36.00*
Malleable	42.50-43.50
Rails, Rerolling	*48.00-49.00*
Rails, Random Lengths	*38.00-39.00*
Rails, 2 ft and under	*44.00-45.00*
Rails, 18 in. and under	*45.00-46.00*
Railroad Specialties	36.00-37.00
Angles, Splice Bars	39.00-40.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	25.00
No. 2 Bundles	22.00
Machine Shop Turnings	19.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	28.00-29.00
Cut Structurals	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Stove Plate	30.00-31.00
No. 1 Wheels	30.50-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	27.00-28.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	36.00
Angles and Splice Bars	35.00-36.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	*28.00-29.00*
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast	*38.00-40.00*
Charging Box Cast	33.00-34.00
Heavy Breakable Cast	32.00-33.00
Brake Shoes	*34.00-35.00*
Clean Auto Cast	*39.00-41.00*
Burnt Cast	*33.00-34.00*

Railroad Scrap

R.R. Malleable	*36.00-37.00*
Rails, Rerolling	*48.00-50.00*
Rails, Random Lengths	37.00-38.00
Rails, 3 ft and under	40.00-41.00
Uncut Tires	*33.00-35.00*
Angles, Splice Bars	*38.00-39.00*
Railroad Specialties	*38.00-39.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50
Cut Structurals	27.50

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	18.00
Malleable	25.00
Brake Shoes	20.00
Clean Auto Cast	27.50
No. 1 Wheels	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	26.00

Cast Iron Grades

No. 1 Cupola Cast	*36.00-37.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	30.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$27.00
No. 1 Bundles	27.00
Mechanical Bundles	25.00
Mixed Steel Scrap	23.00
Mixed Borings, Turnings	20.00
Rails, Remelting	27.00
Rails, Rerolling	30.00
Busheling	21.50
Bushelings new factory, prep'd	25.00
Bushelings new factory, unprep'd	20.00
Short Steel Turnings	20.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.

Sheets Strip . . .

Sheet and Strip Prices, Page 125 & 126

Pittsburgh—For the first time since termination of the war, wrought iron sheets will be made available by A. M. Byers Co., this city. Company plans to have Whitney-Apollo Steel Co., Apollo, Pa., convert wrought iron sheet bars to flat and corrugated hot-rolled annealed wrought iron sheets, black as well as galvanized, in widths up to 48 in. from 8 to 22 gage, commencing June 1. Prices will be 12.00c per pound on black and 15.50c for galvanized, f.o.b. Apollo, Pa.

Superior Steel Corp., Carnegie, Pa., has increased cold-rolled deoxidized copper clad strip, clad on one side, from 19.75c to 20.00c per pound; both sides clad, from 23.75c to 24.25c per pound. The hot-rolled grades were increased to 16.50c per pound for one side clad; both sides clad, 21.00c.

One producer of hot-rolled tight cooperage hoop reduced base price $4 per ton, and adjusted extras upward about $9 per ton to bring them into proper relationship with those on hot-rolled strip.

Boston — That users of silicon grades were caught with low inventories when demand for electrical goods turned upward sharply is apparent from the fact some fabricators are maintaining operations on a car-to-car delivery basis. Some are now trying to cover through the balance of this year on cold-rolled coils, demand taxing mill annealing capacity. Pressure for tonnage scheduled for delivery this quarter is for production, but third quarter buying includes some inventory volume. New consumers in the television field experience difficulty in filling expanding requirements.

New York—While certain sheet producers, in an effort to keep schedules under closer control, have not opened books for the entire third quarter on some grades of sheets in stringent supply, notably cold-rolled, there is little tonnage left for third quarter distribution.

Philadelphia—Consumers complain of inability to get as much tonnage as they desire. Producers are behind on commitments, booked as far ahead on major grades as they care to go. Mills are out of the market for third quarter, except where they are allocating tonnage on a monthly basis. Picatinny, N. J., arsenal has awarded a $3,506,550 contract for fin assemblies to Morris Stamping & Mfg. Co., Vernon, Calif. Approximately 3740 tons of sheets are required.

Cleveland—Sheet sellers are unable to cope with all the demands coming to them. Order backlogs now extend far into summer though only limited new tonnage has been booked for third quarter. Carryover from second quarter will be so heavy relatively little production in that period will be available for new business. No relief in the present tight supply situation is expected soon unless automotive labor difficulties develop over coming weeks accompanied by substantial order cancellations.

Chicago—Second-quarter sheet arrearages will run heavier than mills anticipated; one producer expects to

how Aircomatic® and Heliwelding teamed to fabricate a tough aluminum job

GRIFFIN & COMPANY, Louisville, Ky., received a contract to fabricate a number of all-aluminum evaporative cooler assemblies recently. Part of the assembly consisted of a tank 6½′ long, 5′ wide and 2′ high, constructed of 3/16″ aluminum sheets. Air Reduction was consulted to determine the most expedient welding process.

J. X. Merkt and C. G. Davis, Airco Technical Sales Representatives, recommended that both Aircomatic welding and Heliwelding be used. The high speed and the ability to make welds without interruption resulted in an economy that clearly favored Aircomatic for the tank welding. Heliwelding was used in the fittings because Aircomatic's extreme high speed would have made this application quite difficult.

In all, there were 279″ of weld per tank and the approximate welding time, including fit-up and tacking, was but one hour. *Warpage and distortion were completely eliminated and, thus far, 120 of these assemblies have been completed without a single leak.* The amount of aluminum used on this job totalled 125 tons.

If you have a particular fabrication problem involving aluminum, stainless or the bronzes, investigate the advantages of Aircomatic and Heliwelding. For technical service or for descriptive literature on these two processes, please write your nearest Airco office for copies of ADC-709 and ADC-661.

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MONARCH

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have only five weeks' output available for the third quarter. Some consumers are trying to book fourth quarter tonnage without success; orders have been offered by automotive accounts for first quarter of next year.

Cincinnati—Tightness in sheet supply is unrelieved. Pressure for tonnage is expected by all classes of users. Mills are assured capacity operations through third quarter. Stainless is becoming more extended, deliveries ranging 8 to 12 weeks.

Birmingham—Demand for sheets exceeds supply. This is particularly true of items in roofing and even more so in galvanized which is sold out.

Los Angeles—Fabricators are hungry for sheets, and are placing as much tonnage as producers will accept. With galvanized on 180-day delivery and with shipments on hot-rolled extended, flat-rolled products are nearing the critical supply stage.

San Francisco—Unusually heavy demand for light, flat-rolled products continues. Reduced shipments from eastern mills are pinching many fabricators. West Coast production is at capacity, but supply is less than demand.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 125

Chicago—Less highway work than anticipated has opened up to reinforcing bar interests but other construction, principally apartment work, has offset this. Price competition continues.

Seattle—Rolling mill operations are steady. Projects involving large quantities of reinforcing bars are lacking, but total small jobs has built up a 60-day backlog. Outlook is promising.

Wire . . .

Wire Prices, Page 127

Boston — On specialties requiring longer processing, high carbon material mills are booked into September, backlogs including some tentative fourth quarter orders. Manufacturers' wire and low carbon grades are not as far extended. Pressure for valve spring wire and other automotive specialties is strong.

Cleveland—Wiremakers' books are loaded with sufficient tonnage to carry them well into summer. Seasonal demands are heavy with the farm trade and builders specifying actively. Merchant trade is unsatisfied and manufacturers' requirements are expanding in various directions. Automotive needs exceed expectations. Effect of the rail strike on shipments is uncertain. Sellers plan to resort to alternative transportation where such is necessary and possible.

Chicago—Manufacturers' wire reflects high furniture and automakers' operations and specialty wire mills are also entertaining good business. Nail stocks, seriously depleted earlier this year, have been built up but are expected to undergo heavy inroads as building season progresses. Fencing requirements are picking up in the Midwest.

Birmingham—Seasonal demand for wire products has resulted in a fairly tight situation in some items, notably

woven fencing and nails. Manufacturers' wire continues in good demand with most requirements met.

Los Angeles—Wire buying is depressed; supplies are good in all categories. End of the Chrysler shutdown is not expected to increase demand appreciably for some weeks.

Tubular Goods . . .

Tubular Goods Prices, Page 128

New York—While in certain adjacent areas merchant pipe trade is spotty, demand locally continues strong. Distributors are taking full quotas. The market is sustained in part by continued high activity in housing construction.

Central Hudson Gas & Electric Co. has been permitted to lay two 8-in. gas pipe lines on the bed of the Hudson river, between Poughkeepsie, N. Y., and the west shore of the river.

Boston—Merchant steel pipe allocations to jobbers for June are not being taken up in full, notably butt-weld. Any surplus will be moved by direct shipments, inquiry for which is heavier. Some June volume has been blanked out or reduced against expected lower production during vacations.

Steel Bars . . .

Bar Prices, Page 125

Cleveland—Strong demand for merchant bars is reflected in continued tightening in supplies. Consumption is increasing. Farm implement requirements are noticeably heavier, and automotive partsmakers are specifying actively. Machine tool builders are showing more interest. Some forge shops report difficulty obtaining all the stock they require. Producers are booked into August on popular sizes.

Pittsburgh—Practical capacity output is indicated through third quarter on all bar classifications. Projected production schedules of screw machine interests, machine tool builders, and farm implement concerns are more optimistic. Continued heavy demand is in evidence from the petroleum industry, electrical appliance makers, and automotive parts suppliers. However, prolonged strike among General Motors Corp.'s plants would adversely affect output of bars.

New York—Most sellers of hot carbon bars are booked through August on the smaller sizes and through July on the larger sizes. Demand is expanding and some sellers likely will be out of the market soon for third quarter.

Boston—Hot-rolled carbon bar deliveries range from July to September with more units booked through third quarter on smaller sizes. One eastern producer has resumed allocation of both hot and cold-rolled carbon.

Philadelphia—Hot carbon bar demand continues to expand. Producers have little to offer before mid-July and then only certain sizes.

Chicago—Carryover of bar tonnage into third quarter is considerable, although not as large as for flat-rolled. Consumers are pressing for better de-

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Equally applicable for both small or large scale operations, the new Hewitt-Robins Sectional Belt Conveyor is a packaged unit that can be assembled by your own workmen—and in considerably less time than required for conventional type conveyors.

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Like all Hewitt-Robins machinery, this new Sectional Belt Conveyor is carefully designed, strongly constructed. It is equipped with world-famous Robins Troughing and Return Idlers with one-shot lubrication. Curved decking protects the return strand of the belt.

And remember, only Hewitt-Robins is able to take single, unified responsibility for a successful Belt Conveyor installation —machinery and belting. For complete information on the new Hewitt-Robins Sectional Belt Conveyor, write today for Bulletin No. 132. Address Robins Conveyors Division, 270 Passaic Avenue, Passaic, N. J.

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livery, but no improvement is noted. Operations of cold finishers and forgers are limited by hot bar stocks.

San Francisco — Supplies of bars are ample. Demand is spotty.

Structural Shapes . . .

Structural Shape Prices, Page 125

Boston — Although some district fabricating shops are booked into September, competition for tonnage on an industry-wide basis operates against firming of prices. Volume coming out for estimates is sustained, public work, including bridges and schools, accounting for fully 90 per cent. Estimating boards are crowded.

Approximately 24,400 ft of metal railings and 542,000 pounds of castings will be required by the New Jersey Turnpike Authority for the Hackensack river and Passaic river bridges. In addition, total structural requirements amount to about 36,000 tons. As noted last week, Bethlehem Steel Co., Bethlehem, Pa., is low on the Passaic river bridge, with a bid of $7,288,810.15, and the American Bridge Co., Pittsburgh, low on the Hackensack bridge, with a bid of $5,326,890.

Cleveland—Deliveries on standard shapes are more extended as the building season advances. Wide-flange beams are as tight as ever. Small private jobs are numerous and much public work is taking increasing tonnage. Pending work in this immediate district includes school projects at Avon Lake, O., North Royalton, O., South Euclid, O., and Lyndhurst, O. A hospital, estimated to cost $3 million, is pending for the Euclid-Glenville Hospital Association, Cleveland.

Chicago—Fabricator activity is increasing and shape supply is tightening. Despite sizable inventories at some shops pressure for steel is more noticeable.

Birmingham — Fabricating shops are fairly well booked and able to take care of most requirements promptly. However, most of the business consists of scattered small projects.

Los Angeles—Spottiness in demand for structurals continues. Inquiry for bar sizes and lighter-weight channels is showing the results of continued peak activity in construction.

San Francisco—Public works remain the mainstay of structural shape demand. Private building is more active and new plans may come off draftmen's tables soon.

Seattle—Fabricating plants report good volume of small jobs running from 20 to 50 tons each. Operations have been stepped up. Backlogs run through third quarter.

Semifinished Steel . . .

Semifinished Prices, Page 125

Chicago—Conversion should prove as lucrative a sideline for certain mills this year as in 1947-48. One reports 13 per cent of all its finished steel shipments are on conversion arrangements. With one or two exceptions, the same ingot makers who previously offered their raw steel to consumers for rerolling elsewhere are again active, although prices are

not as extreme as those reported in previous steel shortage years. Conversion ingots are selling here at $70-$75.

Operations in the gray market are being resumed; the "daisy-chain" system has reappeared.

Cleveland—Some conversion ingot business is being done but the tonnage involved does not compare with that during the shortage of a year or so ago. One of the prominent producers of conversion ingot in 1948 now is devoting only a part of its capacity to this class of business. Conversion ingot is selling at around $70 per ton.

Plates . . .

Plate Prices, Page 125

Chicago—Consumers being forced to look to eastern sources for their requirements is a matter of much concern to mills here, but capacity is taxed by demands from all directions. Tonnage continues to be available outside the district for prompter delivery than is quoted here.

New York—Plate demand is expanding steadily. Exceptions are shipyard and pressure vessel requirements. Eastern plate mills are now booked into August on the lighter thicknesses and into late June on the heavier, 1½ inch and over.

Boston — Demand is centered strongly in lighter plates on which deliveries extend into August. Plates in this category require larger volume of heads. Plate consumers are more inclined to place orders beyond backlog commitments, fabricating shops and industrial users seeking to build inventories.

Union Barge Line Corp. opens bids May 22 in Pittsburgh for construction of ten all-welded steel-covered and ten all-welded hopper barges.

Philadelphia—Eastern mills are being fairly flooded with inquiry for light gage plate. Producers are turning down substantially more tonnage than they are accepting.

Birmingham — Plate supplies run considerably behind demand. Some large users, who have been forced to delay contracts, are slowly building stocks.

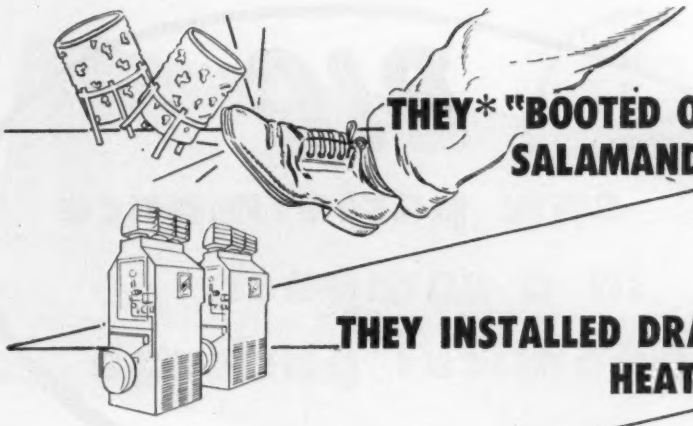
Los Angeles — Plate supplies are tightening, with demand increasing. Kaiser Steel Corp. is allocating plate, top priority going to pipeline requirements. Columbia Steel Co. quotes 90 days delivery; has not opened third quarter books.

Seattle—Boiler and tank shops have fair backlogs. They report strong seasonal demand for storage and oil tanks involving small tonnages of plates. Stainless plates are scarce, mill delivery being 10 to 12 weeks.

Tin Plate . . .

Tin Plate Prices, Page 126

Pittsburgh—Carnegie-Illinois Steel Corp. has reduced special coated manufacturing ternes 15 cents to $6.35 per 100 pounds at Gary, Ind., and Irvin, Pa. Similar action has been taken by Tennessee Coal, Iron & Railroad Co. at Fairfield, Ala., to $6.45; by Wheeling Steel Corp. to $6.35, Yorkville, O. The new price level is comparable to ¼-pound elec-



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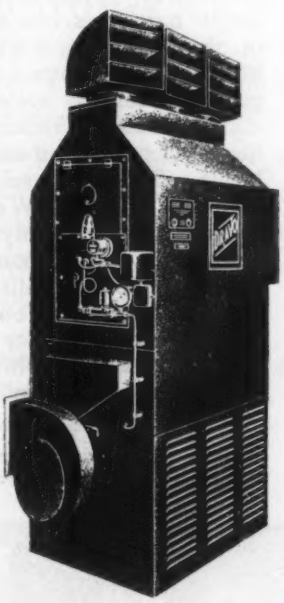

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trolytic and it is hoped paint and oil can manufacturers will specify manufacturing ternes in place of ¼-pound electrolytic to ease growing increase in demand for latter. Decision to discontinue production of 12-pound coated ternes also was made by Wheeling Steel last week. Unconfirmed reports indicate Bethlehem Steel Co. may resume output of special coated manufacturing ternes; Inland Steel Co. no longer is producing this item.

San Francisco—Firming prices and recent substantial sales of canned goods by packers indicate this season's pack may exceed expectations. Packers haven't definitely decided on their full tin plate requirements, but signs point to heavy consumption beginning about July 1.

Ferroalloys . . .

Ferroalloy Prices, Page 129

New York—Steady increase in the buying of foreign ferromanganese is featured by purchase of 10,000 tons by a Gulf states consumer. Importations are small compared with domestic consumption.

Pig Iron . . .

Pig Iron Prices, Page 124

New York—While pig iron shipments are slightly heavier, district foundry melt is showing little further improvement, and operations still leave much to be desired. Jobbing shops are averaging about four days a week. Shipments of iron appear to be slightly heavier than consumption ascribed in part to overestimation of needs by some buyers.

Purchase of 10,000 tons of German basic iron at under $40 a ton, duty paid, seaboard, is noted.

Boston—A Worcester, Mass., consumer bought 10,000 tons of German basic iron at under $40, dock. This follows a recent purchase by another district steelworks of 1000 tons of Austrian basic with additional tonnage under consideration. Demand for foundry grades is heavier. Everett output is moving directly to consumers, although that furnace is operating below capacity.

Pittsburgh — Foundry iron consumption is expected to be heavy well into third quarter. Melt is heavy in captive foundries serving builders of steel mill and heavy electrical equipment as well as enamelware and radiation industries. Despite slight improvement in miscellaneous demand for castings among small jobbing concerns, this type of activity remains depressed with most interests operating about four days per week. National Tube Co. has blown out its No. 4 blast furnace at McKeesport plant for relining, leaving 43 out of 47 units active in this district.

Philadelphia—While pressure pipe shops and sanitary ware producers are operating at a high rate and are booked far ahead, casting demand in general is a bit spotty. Foundry iron sellers say there is not quite the pressure there was, although capacity is well booked up for the remainder of this month. Some foreign iron is being purchased. A New Jersey soil pipe producer recently closed

on 2000 tons of German iron.

Cleveland—Merchant iron buyers are specifying actively on contracts. Some new business is being placed. Foundry requirements have increased noticeably over recent weeks, but iron supply is adequate for expanded needs. While no shortages are reported, the furnaces are shipping every pound of metal produced for the merchant trade and there is no surplus. Strike of molders at 10 local gray iron foundries ended after 7-days' interruption of production.

Cincinnati—Foundry melt is increasing, as reflected in heavier specifications for pig iron for May delivery.

Birmingham — Merchant iron furnaces are meeting most urgent demands here. However, requirements are expected to exceed this districts capacity as long as construction maintains present pace.

Seattle—Foreign pig iron, currently serving the foundries in this area, comes from the British zone of Germany, delivered monthly at $47.56 or about $7 under the domestic price. Sellers offer it on a basis of any analysis desired by the consumer, as regards silicon, phosphorus and sulphur.

Iron Ore . . .

Iron Ore Prices, Page 129

Cleveland—Iron ore is moving down the lakes to furnaces but ice on the upper lakes continues to hamper shipments. It probably will be another week or so before uninterrupted movement is possible. Whether shippers can make up the tonnage lost by the late shipping start is a matter for speculation in the trade. Generally it is agreed the slow start makes late season navigation necessary.

Shipments of Lake Superior iron ore totaled 1,391,703 tons the week ended May 8, making the season's total to date 1,740,507 tons compared with 11,827,795 tons for the like period a year ago.

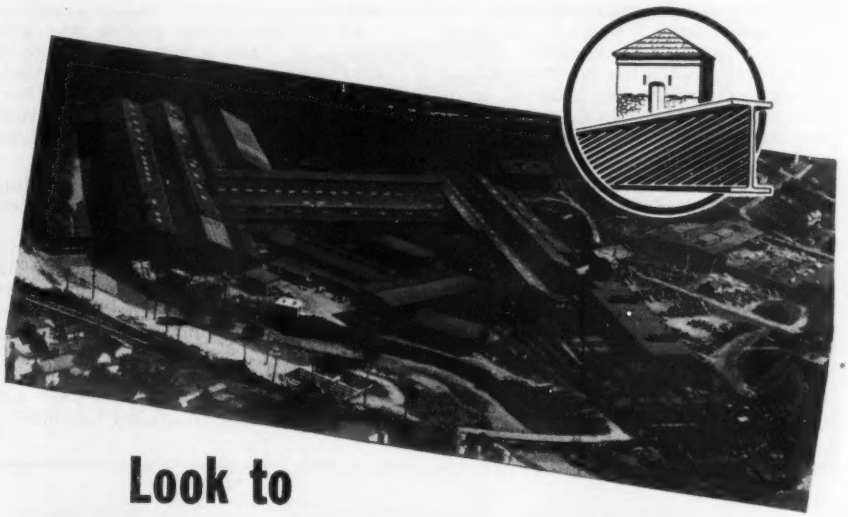
The railroad strike is forcing diversion of some cargoes from affected railroad docks to unaffected docks.

Scrap . . .

Scrap Prices, Page 132

Pittsburgh—No. 1 heavy melting steel is up 50 cents to $36 on last confirmed mill purchase. This level is not representative since mills are unable to purchase additional tonnages at that figure and brokers freely offer $36 to fill old orders or to obtain material for delivery on higher priced orders not acknowledged by the mills. A similar market situation exists for No. 1 hydraulic bundles. Strength in turnings is evidenced in higher prices paid by crushers. Cast grades are up $1 on recent purchases. Railroad strike held up scrap shipments last week, but stocks are ample for at least two weeks' operations.

Boston — Steel scrap prices are steady. No. 2 heavy melting differential is out of line with No. 1 for which recent buying has been more active. Same holds for several minor grades, No. 1 heavy busheling selling $1 under heavy melting. Cast scrap is



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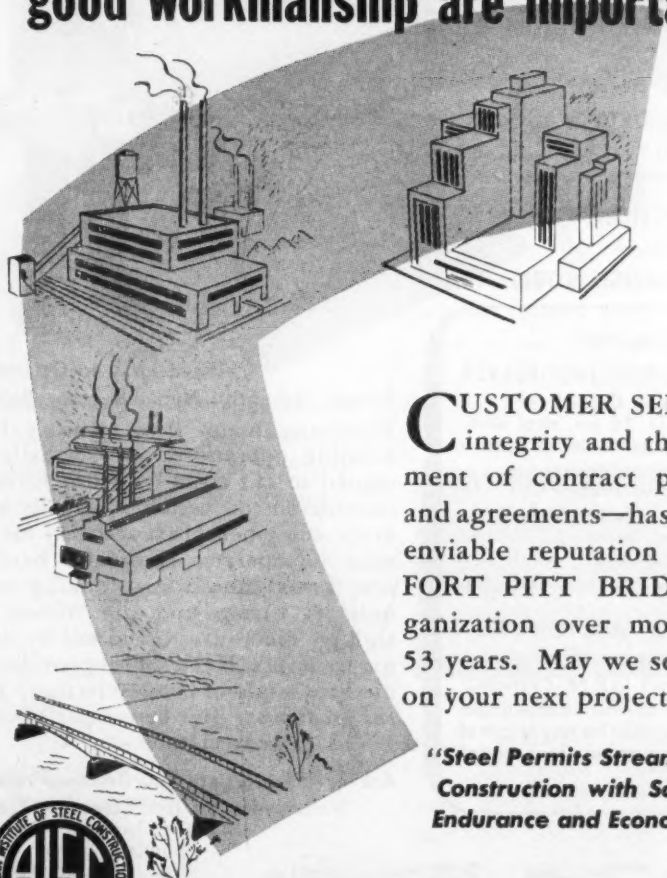

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firm with some grades higher.

Philadelphia—Prices on open-hearth scrap are sharply higher. Most cast grades are unchanged. Offerings of foreign pig iron at below $40, duty paid, are having a depressing influence on cast scrap.

New York—Scarcity in open-hearth grades of scrap is causing brokers to further advance buying prices. Cast grades are unchanged. Scrap brokers last week were able to move scrap, despite the railroad firemen's strike, to Bethlehem, Pa., certain other eastern Pennsylvania points, and Lackawanna, N. Y., without much difficulty, but were seriously handicapped moving tonnage into the Pittsburgh area. Complicating traffic movement was a shortage of cars.

Cleveland—Scrap prices are generally 50 cents a ton higher here on the basis of purchases by brokers. Some new commitments have been made by mills, but the transactions are being kept quiet with principals refusing to reveal prices.

Cincinnati—Scrap prices continue to climb with No. 1 heavy melting quoted $32.

Birmingham—Considerable activity in scrap is noted. Advent of increased agricultural scrap shipments may alter the upward price tendency noted over the last several weeks.

St. Louis—Scrap continues to strengthen. No. 2 heavy melting steel moved up $1, as did most cast and railroad items. Railroad specialties jumped $3 under a spurt of buying by casting plants.

Los Angeles—Scrap demand continues to lag. There is no indication that prices on steelmaking grades in this district will follow the rise in eastern centers. Resurgence in foundry activity has boosted No. 1 cupola cast $2 to $36-$37.

San Francisco — Scrap prices are unchanged. Large users still are on a hand-to-mouth basis.

Seattle—Steel scrap prices are unchanged. Dealers are watching the increased firmness of eastern markets, but no immediate change is expected here.

Chicago—Scrap market at the broker-dealer level continues to boil but the mills are not ready to concede defeat in their price fight. Brokers have had to push their buying prices progressively higher to get scrap to cover old orders, and some are losing $2-3 a ton on No. 1 heavy melting. A rumor that one consumer had bought at $32 was denied.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 128

Pittsburgh—Supply of foundry coke is adequate to meet current requirements. Preference for oven foundry coke remains in evidence with some tonnage occasionally shipped here from the Philadelphia district.

Warehouse . . .

Warehouse Prices, Page 129

Cleveland—Warehouses expect order volume to be adversely affected should the railroad firemen's strike force manufacturers to curtail operations because of back-up shipments. May warehouse order volume compares well with April bookings, best experienced in a long time. Manufacturing operations in this area have been expanding over recent weeks, stimulating warehouse volume. At the same time, tight mill supply has served to divert some tonnage to distributors. However, shortage of flat-rolled material is just as serious with the warehouses as it is with the general consuming trade, and they have been forced to turn away business. Gray market operations have been resumed, but such trading is extremely limited with most buyers refusing to pay premium prices.

Pittsburgh — Daily average shipments from steel distributors' stocks have recorded little change to date this month. Unbalanced warehouse stocks, notably in galvanized and cold-rolled sheets, are a retarding factor.

Philadelphia — Warehouse demand is leveling off. Some large sellers doubt if May business will exceed April's, or even quite approach it. Galvanized sheet extras are undergoing adjustment due to further increases in zinc.

Cincinnati—Warehouse volume is maintained at good level, with demand broad.

Los Angeles — Distributors report consumer demand firm, several warehouses showing greater dollar sales in April than in March. Supplies are in good balance, with exception of sheet and strip.

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San Francisco—Distributors report an increasingly favorable volume of business. Demand is concentrated in flat-rolled products, but business in several other items is improving.

Seattle—Warehouse steel turnover is increasing. Inability of mills to make quick delivery has caused larger buyers to turn to distributors.

Canada . . .

Toronto, Ont.—Pig iron prices in Canada have been advanced $2 per gross ton with new prices as follows: —Base grade, 2.25 Si and under, $50.23; malleable, $51.23 and basic, $50.23 per gross ton, delivered Toronto.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3330 tons, viaducts and miscellaneous structures, contract 2, Olneyville cutoff, Providence, R. I., to Bethlehem Steel Co.; M. A. Gammino Construction Co., Providence, general contractor.

400 tons, junior high school, Wellesley, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; James S. Mozzicato, Medford, Mass., general contractor.

245 tons, junior high school, Attleboro, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Westcott Construction Co., Attleboro, general contractor.

145 tons, junior-senior high school, Cohasset, Mass., to West End Iron Works, Boston; Volpe Construction Co., Cambridge, Mass., general contractor; Bethlehem Steel Co., awarded 50 tons, reinforcing bars.

100 tons or more, state hospital additions, Greenfield, Mass., to Hub Steel & Iron Co., Somerville, Mass.; C. D. Purington Co., Inc., Providence, R. I., general contractor; reinforcing steel awarded Plantation Steel Co., Providence.

100 tons, King county, Washington, Cedar river bridge, to Bethlehem Pacific Coast Steel Corp., Seattle; State Construction Co., Seattle, general contract.

STRUCTURAL STEEL PENDING

3000 tons, apartment, 18th and Walnut streets, Philadelphia; McCloskey & Co., that city, general contractors; bids close May 22.

2325 tons, contract 23, New Jersey Turnpike Authority, Middlesex county; Brookfield Construction Co. Inc., New York, low on general contract; project also requires 13,380 ft of conduit pipe and 5500 ft of steel railing.

1600 tons, Mystic pier 1, Charleston, Mass.; Merritt-Chapman & Scott Corp., New London, Conn., low, general contractor.

1300 tons, contract 28, New Jersey Turnpike Authority, Union Building & Construction Corp., Passaic, N. J., low on general contract.

1300 tons, Pennsylvania turnpike bridge work, sec. 31.B, Allegheny county; bids May 31.

1000 tons, University of Washington utilities tunnel; general contract to General Construction Co., Seattle.

822 tons, Pennsylvania turnpike bridge work, sec. 29-C; bids May 31.

450 tons, Washington state steel truss bridge, Whatcom county; bids to Olympia, May 23.

400 tons, railroad and highway relocation, McNary dam, and Juniper Canyon plate girder bridge; bids to U. S. Engineer, Walla Walla, Wash., June 7.

320 tons, contract 25, New Jersey Turnpike Authority bridge, Elizabeth, N. J.; bids June 6; 80 tons of bars also required.

315 tons, state railroad underpass, Trenton, N. J., bids May 25.

300 tons, state bridge, route 26, Mercer county, New Jersey; bids May 26.

300 tons, state bridge, New Castle county, Delaware; bids May 24.

200 tons, warehouse, Fred Whittaker Co.,

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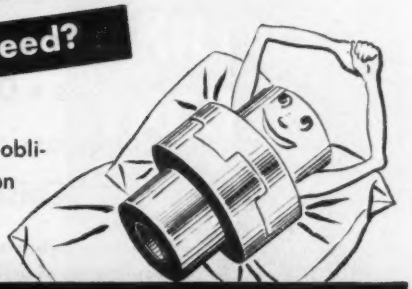

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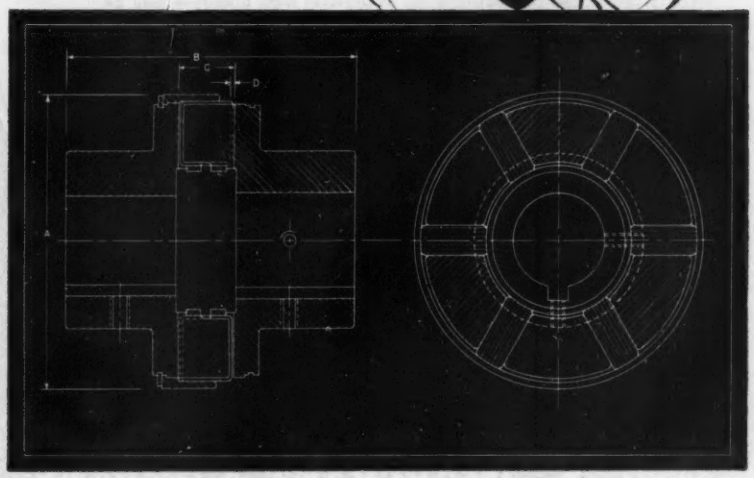

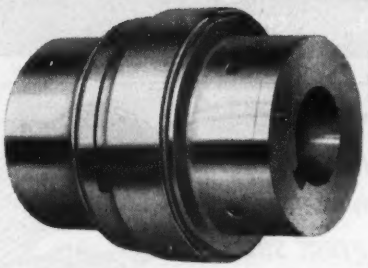

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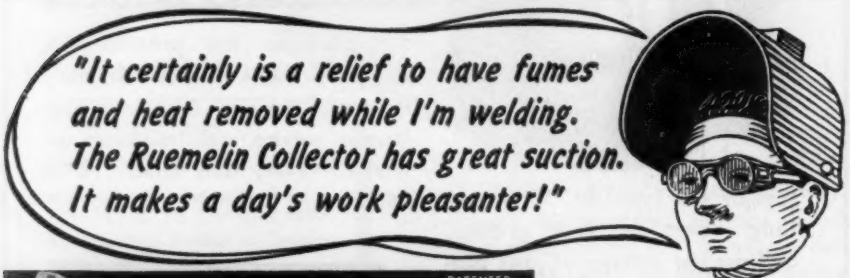
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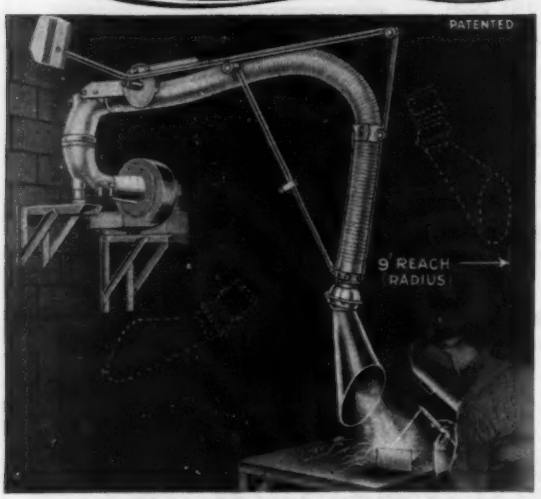

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Philadelphia; Ballinger Co., that city, asking bids.

197 tons, Pennsylvania turnpike bridge, sec. 29-B, Lawrence county; bids May 31.

100 tons, including steel piling, Savage river bridge, Alaska; bids to General Services Administration, Seattle, May 16.

Unstated, three gate hoists, controls, fixed wheel gate frames, etc., Canyon Ferry power plant, Montana; bids to Bureau of Reclamation, Denver, June 1.

REINFORCING BARS . . .

REINFORCING BARS PLACED

200 tons, Alaskan projects, to Northwest Steel Rolling Mills Inc., Seattle; Drake-Puget Sound Co. joint contractors.

190 tons, junior high school, Weymouth, Mass., to Joseph T. Ryerson & Son Inc., Cambridge; Thomas O'Connor & Co. Inc., Boston, general contractor; miscellaneous structurals to Security Steel & Wire Works Somerville, Mass.

140 tons, junior high school, Wellesley, Mass., to U. S. Supply Co., Boston; James S. Mozzicato, Medford, Mass., general contractor.

120 tons, stadium, Spokane, Wash., to Northwest Steel Rolling Mills Inc., Seattle; McInnis & Henry George & Sons, Spokane, joint contractors.

100 tons, hospital addition, Everett, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; H. S. Wright Co., Seattle, general contract.

Unstated, 3000 ft 52 and 72 in. reinforced concrete pipe for Portland, Oreg., sewage outfall system, to American Pipe & Construction Co., Portland; Manson Construction & Engineering Co., Seattle, general contractors.

REINFORCING BARS PENDING

275 tons, Washington state highway projects, Whatcom county; bids to Olympia, May 23.

116 tons, University of Idaho music building, Moscow; C. B. Lauch Construction Co., Boise, general contractor, low $369,986.

100 tons, University of Washington utilities tunnel; general contract to General Construction Co., Seattle.

100 tons, relocation and highway construction, McNary dam, Columbia river; bids to U. S. Engineer, Walla Walla, Wash., June 7.

100 tons, also 35 tons shapes, King county Green river bridge; bids to county commissioners, Seattle, May 16.

PLATES . . .

PLATES PENDING

Unstated, tanks and miscellaneous, Canyon Ferry power plant; Montana; bids to Bureau of Reclamation, Denver, June 1.

Unstated, steel tower and storage tank, Hazel Dell district; bids to Clark County P U D, Vancouver, Wash., June 5.

Unstated, 200,000-gal elevated water tank, Menlo Park district, Portland, Oreg.; bids called May 8; C. E. Carter, Portland, engineer.

PIPE . . .

CAST IRON PIPE PLACED

1150 tons, 24-in. cast iron pipe, Metropolitan District Commission, Boston, to United States Pipe & Foundry Co., Phillipsburg, N. J., through Allied Engineers Co., Boston, general contractor.

CAST IRON PIPE PENDING

1000 tons or more, 16 to 3 in. standard bell and spigot, class 150; bids to Everett, Wash., May 8.

300 tons, 12 to 4 in. and accessories; bids to C. E. Carter, Portland, Oreg., engineer for Menlo Park district, May 8.

Unstated, four miles 12 in., and alternatives; bids to Toledo, Oreg., May 18; $100,000 available.

STEEL PIPE PENDING

Unstated, 96,000 feet 8 and 4 inch, also bids

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for alternatives, to Vancouver, Wash., June 5.

RAILS, CARS . . .

RAILROAD CARS PLACED

Delaware & Hudson, 500 fifty-ton box cars, to be leased from Equitable Life Assurance Society, upon construction by Pullman-Standard Car Mfg. Co., Chicago.

Havana, Cuba, 100 transit buses, to A.C.F.-Brill Motors Co., Philadelphia.

New York Central, one stainless steel diesel car, to Budd Co., Philadelphia; this is the third to have been placed by this railroad with the Budd Co.

RAILROAD CARS PENDING

Gulf, Mobile & Ohio, 100 seventy-ton hopper cars; purchase authorized.

LOCOMOTIVES PLACED

New York, Chicago & St. Louis, ten diesel-electric locomotives; four 1200-hp switching units going to Lima-Hamilton Corp., Lima, O.; three 1200-hp switching units to the Electro-Motive Division, General Motors Corp., La Grange, Ill.; two 1000-hp and one 660-hp switching units to the American Locomotive—General Electric Companies, Schenectady, N. Y.

New York, New Haven & Hartford, 40 diesel-electric locomotive units, twenty 1600-hp road switchers going to American Locomotive—General Electric Companies, Schenectady, N. Y.; ten similar units to Fairbanks Morse & Co., Chicago, and ten 1200-horsepower yard switchers to Lima-Hamilton Corp., Lima, O.

Wabash, 77 diesel-electric locomotives, placed; included are 15 double unit 3000-hp freight, one 3-unit 4500-hp freight, three 1500-hp road switcher, eight 1200-hp road switcher and two 800-hp switchers, going to Electro-Motive Division, General Motors Corp., La Grange, Ill., for operation on domestic lines; ten 2-unit 3000-hp freight, one 1500-hp road switcher and three 800-hp switchers to General Motors Diesels Ltd., for operation in Canada; and seven 1200-hp switchers to Lima-Hamilton Corp., Lima, O., for domestic operation.

LOCOMOTIVES PENDING

Gulf, Mobile & Ohio, 12 diesel-electric locomotives; purchase funds authorized.

Nashville, Chattanooga & St. Louis, 47 diesel-electric units; funds appropriated; list includes seventeen 1500-hp road switchers, sixteen 1500-hp road units and ten 1200-hp road switchers; also four special switching units.

FERROALLOYS

(*Continued from Page* 129)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50%

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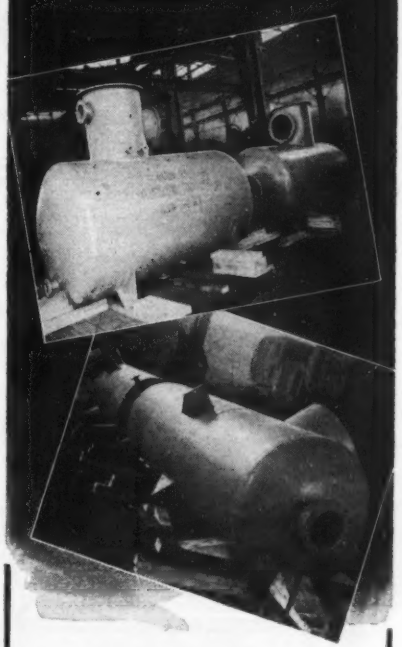

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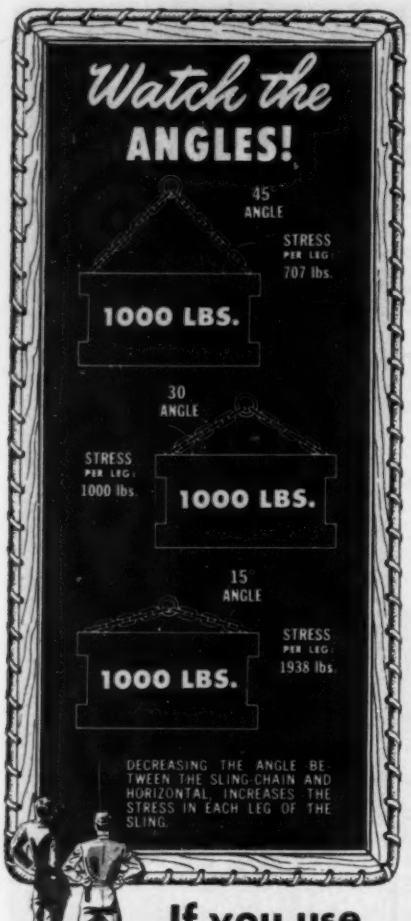
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30° ANGLE
STRESS PER LEG 1000 lbs.
1000 LBS.
15° ANGLE
STRESS PER LEG 1938 lbs.
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Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

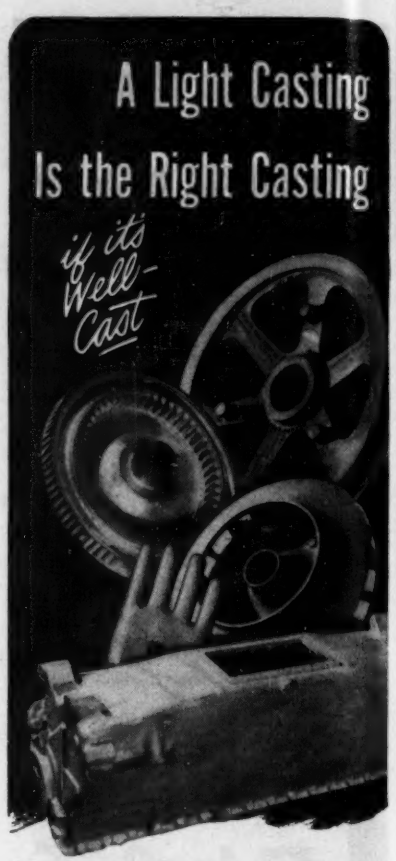
Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.



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Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primes and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Berosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2% contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min. C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

California

Blaw-Knox Co., Pittsburgh, opened a West Coast district office in the Monadnock Bldg., San Francisco. Louis J. Sarosdy, manager, is assisted by Lester M. Horton.

California

Chiksan Co., Brea, Calif., appointed Robert S. Hudgins Jr., 118 N. Chase St., Charlotte, N. C., as representative in North and South Carolina. **Southern Corp.**, Charleston, S. C., will continue to represent Chiksan in the pulp and paper industry in these states. **R. S. Stover Co.**, Kresge Bldg., Marshalltown, Iowa, is appointed representative to cover Iowa and Nebraska.

California

C. F. Braun & Co., Alhambra, Calif., designer and builder of oil refineries and chemical plants, and manufacturer of specialized apparatus for oil refineries and chemical plants, completed a $1 million research building.

California

United Concrete Pipe Construction Co., Baldwin Park, Los Angeles, Calif., plans to invest more than $1 million in developing a concrete and steel pipe manufacturing plant in Tulare, Calif.

California

Sierra Candy Co., San Francisco, formulates a million dollar expansion program, including a new plant; about $400,000 will be spent on new equipment.

Connecticut

All sales and administrative offices of **American Screw Co.** are now located at the company's new plant in Willimantic, Conn. A. L. Fleck is general sales manager.

Delaware

Douglas Machinery Co. Inc., machinery, has been chartered by the state of Delaware. Capital of the firm is listed at $100,000. Corporation Trust Co., Wilmington, Del., is serving as the principal office.

Delaware

Swedish Sponge-Iron & Metal Powder Corp.—iron and other ores—has been chartered by the corporation department, secretary of state's office, Dover, Del. Capital of the firm is listed at $300,000. United States Corporation Co., Dover, is serving as the principal office.

Idaho

Atomic Energy Commission, Washington, has announced plans at Idaho Falls, Idaho, for immediate development of a $52,750,000 reactor testing station. Contracts totaling $6 million have been awarded; $12 million additional will be awarded soon.

Illinois

C. K. Turk Corp., South Bend, Ind., moved its Chicago offices to 910 W. Jackson Blvd.

Illinois

Gould Storage Battery Corp., Trenton, N. J., moved its Chicago regional offices to 100 E. Ohio St.

Indiana

Control of **Southern Electric Inc.**, 5025 Columbia Ave., Hammond, Ind., is acquired by **Frank J. Rief Jr.**, president, and **Frank J. Rief Sr.**, chairman. William F. Bell is vice president-engineering and Robert L. Moxley, vice president-sales.

Maryland

Rheem Mfg. Co., Sparrows Point, Md., manufacturer of storage tanks, water heaters, range boilers, etc., will begin immediately the erection of two 1-story buildings.

Maryland

Remco Inc., Lansdowne, Md., will build a 1-story plant for manufacture of domestic oil tanks. John P. Michel is vice president and general manager.

Maryland

A. Amereihn & Co., Baltimore, ornamental iron works, are equipping a plant addition, doubling the company's capacity.

Maryland

Plastic Assembled Products Co., 1149 Watson St., Baltimore, plans to start work shortly on the erection of a 1-story plant. The company's branch plant at Elkton, Md., now being enlarged, will continue to operate.

Maryland

Mathieson Chemical Corp., Mathieson Bldg., Baltimore, has completed organization of the Mathieson Hydrocarbon Chemical Corp. In cooperation with the Tennessee Gas Transportation Co., the new organization will build two plants near Greensburg, Ky., one to cost $17 million and the other $6 million. The new company will produce a number of chemicals from the hydrocarbons contained in the natural gas stream transported by Tennessee Gas through a pipeline from Texas in Louisiana fields to eastern markets. Thomas S. Nichols, president, Mathieson Chemical, is also head of the new company. John C. Leppart, also of Mathieson, has been named executive vice president.

Massachusetts

Westinghouse Electric Corp., Pittsburgh, plans to build a lamp warehouse and sales headquarters at Belmont, Mass. Contract for the $250,000 structure has been let to **Thomas Wooster Co.**, Boston. George H. MacGilvray is manager of the Lamp Division's New England district, now located at 10 High St., Boston.

Michigan

Hapman Conveyors Inc., Detroit, and **C. H. Dutton Co.**, Kalamazoo, Mich., manufacturer of steam and hot water generators, have been merged into the **Hapman-Dutton Co.**, with all manufacturing to be centered at the Kalamazoo plant. Dutton Boiler Division and Hapman Conveyor Division will be continued as such. Henry W. Hapman becomes president and general manager; Robert J. Brown vice president, assistant general manager and treasurer; Merrill W. Taylor secretary. Melvin S. Huffaker and Paul I. Moreland, both of Detroit, have been named to the board of directors.

New Jersey

Purolator Products Inc.—filters—has moved its general offices and manufacturing operations to its new plant at 970 New Brunswick Ave., Rahway, N. J.

New York

Scovill Mfg. Co., Waterbury, Conn.,

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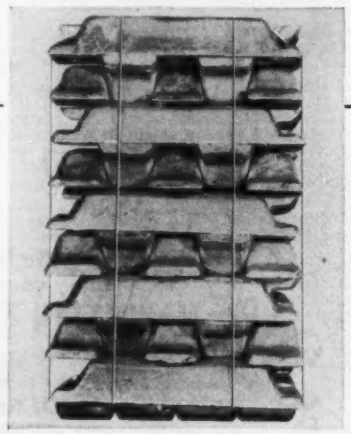

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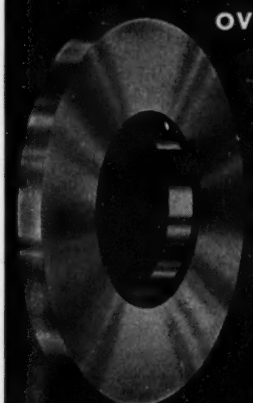

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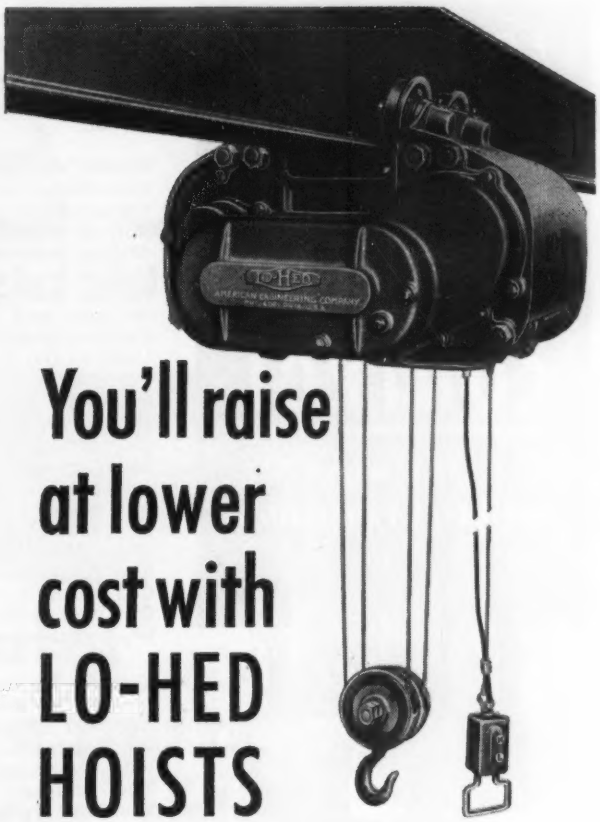

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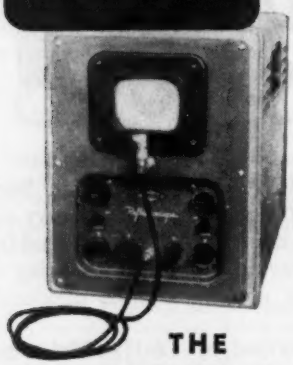

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opens a sales and service office in Rochester, replacing its Syracuse, N. Y., office. Donald L. Bartlett Jr. is manager of the office, located in the Hiram Sibley Bldg., 311 Alexander St.

New York

Doehler-Jarvis Corp., New York, awarded a contract to Jam Handy Organization calling for the production of a motion picture on the die casting process. Purpose of the picture is to give an understanding of the die casting process and to show the size and scope of the Doehler-Jarvis organization and its contributions to the industry. The picture is expected to be ready for distribution by early autumn to technical societies, users and prospective users of die castings, product engineers, technical students, and other groups interested in modern manufacturing processes.

North Carolina

Dave Steel Co. Inc., Asheville, N. C., has purchased the Oregonia Bridge Co., Lebanon, O., for a reputed price of about $250,000. Operations will be continued at the Lebanon plant.

Ohio

Electric Products Co., Cleveland, appointed Vincent J. Brown Co., Buffalo and Syracuse, N. Y., as district representatives for New York state with the exception of New York city. The company also appoints **Muth-Richards Co.** as its representative for the state of Washington and the panhandle of Idaho.

Ohio

Goodyear Tire & Rubber Co., Akron, has started its $1 million expansion and improvement program at its St. Marys, O., plant. The project includes erection of a building to house molded and extruded goods manufacture, warehousing and engineering services. Steel contract is held by **Burger Iron & Steel Co.,** Akron; general contract, by **Clemmer Construction Co.,** same city.

Ohio

Future expansion plans for **Diamond Alkali Co.'s** Painesville, O., plant include expansion of the power plant, at a cost of several million dollars; rehabilitation of the chromate plant; development and construction of the magnesium oxide plant; addition of three new separate units in the chloride department; expansion and modernization of facilities in the washing soda department; construction of a metasilicate plant; and miscellaneous plant improvements.

Ohio

Schneider Sheet Metal & Roofing Co. moved to 185 N. Main St., Marion, O.

Ohio

Clyde Porcelain Steel Corp., Clyde, O., has a contract with **Briggs Mfg. Co.,** Detroit, to porcelain-finish 500 of the latter company's sinks a day, starting this month.

Ohio

J. H. Cristil Co., Edgerton, O., manufacturer of colored aluminum tumblers, is planning to produce colored trays, ice buckets, candy dishes and pitchers.

Ohio

Fredric Flader Inc., North Tonawanda, N. Y., opened a division at 1330 Laskey Rd., Toledo, O. C. P. Weedman is manager of the new division; Dr. V. P. Corey, director of research; Gray Haglund, engineering physics department manager; Ivan Swarman, power engineering tests manager.

Ohio

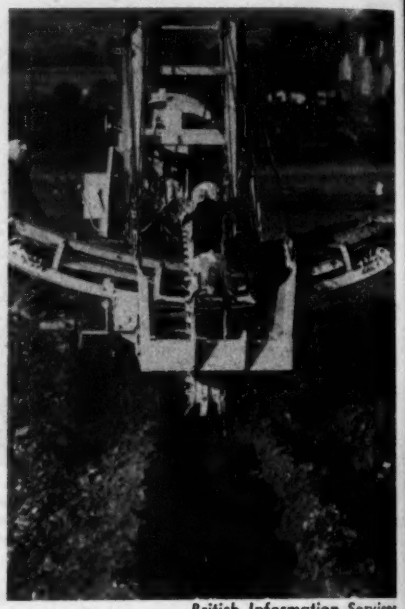
Heppenstall Co., Pittsburgh, moved its Cleveland district sales office to 506 Terminal Tower Bldg. R. E. O'Brien is the Cleveland district sales representative.

Oregon

Ralph & Horowitz, Portland, Oreg., will construct a 10-story office building for the state, having entered the low bid of $1,366,477. Plans are being prepared for two additional stories.

Pennsylvania

Pennsylvania Flexible Metallic Tubing Co., Philadelphia, appointed **Boston Woven Hose & Rubber Co.,** 123 Water St., Pittsburgh, as distributor in that district.



British Information Services

CHANGING LANDSCAPE: American machinery, bought with Marshall Plan dollars, is helping John Bull rebuild his war-shattered economy. This trencher, made by Cleveland Trencher Co., Cleveland, is digging a ditch for a government housing site drainage system

Pennsylvania

Palmer-Bee Co., Detroit, changed the location of their Pittsburgh office to the 12th floor of the Peoples East End Bldg., Pittsburgh 6.

Pennsylvania

National Electric Products Corp., Pittsburgh, bought **I. A. Bennett & Co.,** Chicago, one of the oldest manufacturers' representatives in the electrical industry. R. C. Bennett Jr., former general manager of the Bennett firm, is now vice president and sales manager of National Electric. Earl M. Nelson, sales manager for Bennett, is National Electric's midwest district manager.

Canada

Powell River Co. Ltd., Vancouver, B. C., has expansion plans in excess of $3 million for its paper plant at Powell River, B. C.

Canada

Streeter-Amet Co., Chicago, appointed **Edward A. Horton Sales Co.,** 3071 Bloor St. W., Toronto, Ont., as its distributor in Canada.